THE

AMERICAN JOURNAL

OF THE MEDICAL SCIENCES

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TO READERS AND CORRESPONDENTS.

The reader is requested to make the following correction on p. 419, the 31st line from the top: the word magnesia should be changed to manganese.

The following works have been received:—

Transactions of the Obstetrical Society of London. Vol. IV. For the year 1862. London, 1863. (From the Society.)

On the Diseases, Injuries, and Malformations of the Rectum and Anus, with Remarks on Habitual Constipation. By T. J. Ashton, F. R. M. C. C., &c. &c. Fourth edition. London: John Churchill, 1863. (From the Author.)

The Progress of Ophthalmic Surgery from the Invention of the Ophthalmoscope (in 1851) up to the present time. Being an Oration delivered before the North London Medical Society, on February 11, 1863. By John Zachariah Lawrence, F. R. C. S., Surgeon to the Surrey Ophthalmic Hospital. London, 1863. (From the Author.)

Researches on the Development of the Spinal Cord in Man, Mammalia, and Birds. By J. Lockhart Clarke, F.R.S. From the Philosophical Transactions. London, 1863. (From the Author.)

A Case of Rapid "Wasting Palsy" from Structural Disease of the Spinal Cord. By J. L. W. Thudichum, M. D., Lecturer on Chemistry.

The Investigation of the Nervous Centres, with Comments. By J. Lockhart Clarke, F.R.S., &c. From Dr. Beale's Archives of Medicine, No. XIII., 1863. (From J. Lockhart Clarke, F.R.S.)

Outlines of a New Theory of Muscular Action. By the Rev. Samuel Haughton, M. D., F. R. S. F., Trinity College, Dublin. London and Dublin, 1863. (From the Author.)

The Principles and Practice of Ophthalmic Medicine and Surgery. By T. Wharton Jones, F. R. S., Prof. Ophthalmic Med. and Surg. in Univ. College, London, &c. With 117 illustrations. Third and revised American edition, with additions, from the second London edition. Philadelphia: Blanchard & Lea, 1863. (From the Publishers.)

A Treatise on Hygiene, with Special Reference to the Military Service. By Wm. A. Hammond, M. D., Surgeon-General U. S. A., F. R. C. P. P., &c. &c. &c. Philadelphia: J. B. Lippincott & Co., 1863. (From the Author.)

The Pharmacopœia of the United States of America. Fourth Decennial Revision. By authority of the National Convention for revising the Pharmacopœia, held at Washington, A. D. 1862. Philadelphia: J. B. Lippincott & Co., 1863.

Manual of Instructions for Military Surgeons, on the Examination of Recruits and Discharge of Soldiers: with an Appendix containing the Official Regulations of the Provost Marshal General's Bureau, and those for the Formation of the Invalid Corps, &c. &c. Prepared at the request of the United States Sanitary Commission. By JOHN ORDRONAUX, M. D., Prof. Med. Jurisp. in Columbia College, N. Y. New York: D. Van Nostrand, 1863.

A Manual of Instructions for Enlisting and Discharging Soldiers: with special reference to the Medical Examination of Recruits, and the Detection of Disqualifying and Feigned Diseases. By ROBERTS BARTHOLOW, A. M., M. D., Ass. Surg. U. S. A., &c. &c. &c. Adopted by the Surgeon-General for issue to Medical Officers of the Army. Philadelphia: J. B. Lippincott & Co., 1863. (From the Publishers.)

Consolidated Statement of Gunshot Wounds. By JOHN H. BRINTON. Under direction of Surgeon-General Hammond. Washington, 1863. (From the Surgeon-General.)

On the Medical Selection of Lives for Insurance. By WM. BRINTON, M. D., F. R. C. P., &c. (From W. W. MORLAND, M. D.)

Artificial Dilatation of the Os and Cervix Uteri from Fluid Pressure from Above: A Reply to Drs. Kelly, of Edinburgh, and Arnott and Barnes, of London. By HORATIO R. STORER, M. D., of Boston. Boston, 1863. (From the Author.)

The Treatment of Diphtheria, with Illustrative Cases. By E. N. CHAPMAN, M. D., Prof. Therap. &c. in Long Island College Hospital. Boston, 1863.

Proceedings of the Academy of Natural Sciences of Philadelphia. April, May, 1863.

Extracts from the Records of the Boston Society for Medical Improvement, with Papers read before the Society. By FRANCIS MINOT, M. D., Sec. Soc. Vol. V. No. 1. Boston, 1863.

Medical Communications with the Proceedings of the Seventy-first Annual Convention of the Connecticut Medical Society, held at Rockville, May 27th and 28th, 1863. New Haven, 1863. (From the Society.)

Transactions of the Medical Society of the State of New York for the year 1863. Albany, 1863. (From Dr. GEO. W. BRADFORD.)

The Principles and Practice of Dental Surgery. By CHAPIN A. HARRIS, M. D., D.D.S., &c. &c. Eighth edition, enlarged and revised, with 320 illustrations. Philadelphia: Lindsay and Blakiston, 1863. (From the Publishers.)

Annual Report of the Trustees of the Hospital for the Insane of the State of Wisconsin, for the year ending September 30, 1862. Madison, 1862. (From Dr. J. P. CLEMENT.)

Report of the Western Sanitary Commission, for the year ending June 1, 1863. St. Louis, Mo., 1863.

Influence of the Progress of Medical Science on Medical Art. Address before the Medical Society of the State of New York, delivered February 4, 1863. By THOMAS HUN, M. D., President. Albany, 1863. (From the Author.)

The following Journals have been received in exchange:—

Annales Médico-Psychologiques. Par MM. les Docteurs BAILLARGER et CERISE. March, May, July, 1863.

Gazette Hebdomadaire de Médecine et de Chirurgie. Redacteur en chef, A. DECHAMBRE. Nos. 20, 21, 22. 1863.

Gazette Médicale de Paris. Le Redacteur en chef, JULES GUÉRIN, Nos. 23, 24, 25, 26, 27, 28, 29, 31. 1863.

Revue de Thérapeutique Médico-Chirurgicale. Par A. MARTIN-LAUZER, M. D. Nos. 11, 13, 14, 15, 17. 1863.

The British and Foreign Medico-Chirurgical Review. April, July, 1863.

The Medical Critic and Psychological Journal. Edited by FORBES WINSLOW, M. D. April, July, 1863.

British Medical Journal. March, April, June, July, August, 1863.

The London Medical Review. April, 1863.

Edinburgh Medical Journal. March, April, May, July, August, 1863.

Dublin Quarterly Journal of Medical Science. May, August, 1863.

The Glasgow Medical Journal. April, July, 1863.

Dublin Medical Press. July, August, September, 1863.

Indian Annals of Medical Science. No. XVI.

The Madras Quarterly Journal of Medical Science. October, 1862. January and April, 1863.

Half Yearly Abstract of the Medical Sciences. Edited by W. H. RANKING, M. D., and C. B. RADCLIFFE, M. D. January—June, 1863.

The Retrospect of Medicine. Edited by W. BRAITHWAITE, M. D., and JAMES BRAITHWAITE, M. D. January, June, 1863.

Canada Lancet. Edited by WM. E. BOWMAN, M. D. Nos. 1, 2, 3, 4, 5, 6, 7. Montreal, 1863.

The Boston Medical and Surgical Journal. Edited by SAMUEL L. ABBOT, M. D., and J. C. WHITE, M. D. July, August, September, 1863.

American Medical Times. July, August, September, 1863.

The American Journal of Insanity. Edited by the Officers of the New York State Lunatic Asylum. July, 1863.

The Cincinnati Lancet and Observer. Edited by E. B. STEVENS, M. D., and J. A. MURPHY, M. D. July, August, September, 1863.

The Buffalo Medical and Surgical Journal. Edited by J. F. MINER, M. D. July, August, September, 1863.

The Medical and Surgical Reporter. Edited by S. W. BUTLER, M. D. July, August, 1863.

The Sanitary Reporter. To promote the health, comfort, and efficiency of our Army and Navy. Nos. 1, 2, 3, 4, 5, 6. Louisville, Ky., 1863.

The Pacific Medical and Surgical Journal. Edited by V. J. Fourgeaud, M. D. May, June, 1863.

The San Francisco Medical Press. Edited by L. C. Lane, M. D. July, 1863.

The Chicago Medical Journal. Edited by D. Brainard, M. D., and J. Adams Allen, M. D. August, September, 1863.

The Chicago Medical Examiner. Edited by N. S. Davis, M. D. July, August, 1863.

The American Journal of Ophthalmology. Edited by Julius Homberger, M. D. May, 1863.

The American Journal of Science and Arts. Edited by Profs. B. Silliman, B. Silliman, Jr., and Jas. D. Dana. July, September, 1863.

American Journal of Pharmacy. Published by authority of the Philadelphia College of Pharmacy. Edited by Wm. Procter, Jr., Prof. Pharmacy. July, September, 1863.

The American Druggists' Circular and Chemical Gazette. July, August, September, 1863.

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XV. Origin, Antiquity, and Zoological Relations of Man.

1. The Geological Evidences of the Antiquity of Man, with Remarks on Theories of the Origin of Species by Variation. By Sir Charles Lyell, F. R. S., etc. etc. Illustrated by wood-cuts. George W. Childs: Philadelphia, 1863. 8vo. pp. 518.
2. Pre-historic Man. Researches into the Origin of Civilization in the Old and the New World. By Daniel Wilson, LL. D., Professor of History and English Literature in University College, Toronto, etc. Macmillan & Co.: London, 1862. 2 vols. 8vo. pp. 488 and 499.
3. Evidence as to Man's Place in Nature. By Thomas Henry Huxley. London and Edinburgh, 1863. 8vo. pp. 159.
4. Ethnology and Phrenology, as an aid to the Historian. By J. W. Jackson. Trübner & Co.: London, 1863. 8vo. pp. 324.
5. The Races of the Old World: a Manual of Ethnology. By Charles L. Brace. Charles Scribner: New York, 1863. 8vo. pp. 540.

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6. Pre-Adamite Man: The Story of the Human Race, from 35,000 to 100,000 years ago. By Griffin Lee, of Texas. Sinclair Tousey: New York, 1863. 8vo. pp. 408.
7. A History of the Intellectual Development of Europe. By John William Draper, M. D., LL. D., Professor of Chemistry and Physiology in the University of New York, etc. etc. Harper & Brother: New York, 1863. 8vo. pp. 631.
8. Antiquités Celtiques et Antédiluviennes. Mémoire sur l'Industrie primitive et les Arts à leur Origine. Par M. Boucher de Perthes. Treuttel et Wurtz: Paris, Tome 1, 8vo. pp. 628. Avec 80 planches représentant 1600 figures; Tome 2, 8vo. pp. 511. Avec 26 planches représentant 500 figures.
9. Anthropologie der Naturvölker. Von Dr. Theodor Waitz, Professor der Philosophie zu Marburg. Erster Theil: Ueber die Einheit des Menschengeschlechtes und den Naturzustand des Menschen. 8vo. pp. 487. Zweiter Theil: Die Negervölker und ihre Verwandten. Mit einer Karte und sieben Abbildungen. 8vo. pp. 524. Friedrich Fleischer: Leipzig, 1859, 1860.
10. The Anthropological Review and Journal of the Anthropological Society of London. No. 1. London, 1863. 8vo. pp. 192.
11. Bulletins de la Société d'Anthropologie de Paris, t. 1 et 2. Victor Masson et Fils. Paris, 1860, 1861. 8vo. pp. 576 and 710.
12. Mémoires de la Société d'Anthropologie de Paris. T. 1. Fascic. 1, 2, et 3. Paris, 1861. 462

BIBLIOGRAPHICAL NOTICES.

XVI. Transactions of American Medical Societies.

1. Medical Communications, with the Proceedings of the Seventy-first Annual Convention of the Connecticut Medical Society, held at Rockville, May 27 and 28, 1863. 8vo. pp. 130.
2. Extracts from the Records of the Boston Society for Medical Improvement, with Papers read before the Society. By Francis Minot, M. D., Secretary of the Society. Vol. V. No. 1. From January 13, 1862, to May 11, 1863, both dates inclusive. 8vo. pp. 116. 485

XVII. Reports of American Hospitals for the Insane.

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2. Of the Butler Hospital, for the year 1862.
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XIX. Manual of Instructions for Military Surgeons, on the Examination of Recruits and Discharge of Soldiers. With an Appendix, containing the Official Regulations of the Provost Marshal General's Bureau, and those for the formation of the Invalid Corps, etc. etc. Prepared at the request of the United States Sanitary Commission, by John Ordronaux, M. D., Professor of Medical Jurisprudence in Columbia College, New York. New York: D. Van Nostrand, 1863. 12mo. pp. 238.

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2. A Manual of Instructions for Enlisting and Discharging Soldiers. With special reference to the Medical Examination of recruits, and the detection of disqualifying and feigned diseases. By Roberts Bartholow, A. M., M.D., Assistant Surgeon U. S. Army; Surgeon in charge of McDougall General Hospital; Professor of Mil. Med. Jurisprudence, Army Medical School. Adopted by the Surgeon-General for issue to medical officers of the army. Philada.: J. B. Lippincott & Co., 1863. 12mo. pp. 276. 504

XX. Consolidated Statement of Gunshot Wounds. By John H. Brinton, Surgeon U. S. V. Surgeon-General's Office, Washington, July 1, 1863. 8vo. pp. 11. 504

XXI. Transactions of the Obstetrical Society of London. Vol. IV. For the Year 1862; with a List of Officers, Fellows, &c. 8vo. pp. 338. London, 1863. 505

XXII. The Principles and Practice of Ophthalmic Medicine and Surgery. By T. Wharton Jones, Professor of Ophthalmic Medicine and Surgery in University College, London, Ophthalmic Surgeon to the Hospital, etc. With one hundred and seventeen Illustrations. Third and revised American edition, with additions from the second London edition. Philada.: Blanchard & Lea, 1863. 8vo. pp. 455. 518

XXIII. Outline of a New Theory of Muscular Action: being a Thesis read for the degree of Doctor in Medicine, before the University of Dublin, December 17, 1862. By the Rev. Samuel Haughton, M. D., F. R. S., Fellow of Trinity College, Dublin. Williams and Norgate: London, 1863. 8vo. pp. 23. 519

XXIV. Test-Types for the Determination of the Acuteness of Vision. By H. Snellen, M. D., Surgeon to the Netherlands Ophthalmic Hospital at Utrecht. Printed by P. W. Van de Weijer, Utrecht, 1862. 8vo. pp. 6, with fourteen sheets of tables. 520

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ART. I.—*On Operations for Cleft Palate.* By J. MASON WARREN, M.D.

THE operation of staphyloraphy is of comparatively modern invention. It was first attempted in Europe by Graefe (1817), and was first performed with success by Roux (1819), who seems not to have known of the unsuccessful attempt of the German professor. Shortly after, it was again performed by Dr. John C. Warren, of Boston, who not being aware of what had been done in Europe, himself invented new instruments for it. The operation was at first deemed applicable only to fissures of the soft palate, which, of course, are almost the exceptional cases, as out of from 80 to 100 operations for fissure of the palate which have fallen under my own observation, in not more than a tenth, probably, of the whole number was the fissure limited to the soft parts. Nearly all cases of fissure extending into the hard palate were rejected as unfit for operation, although Roux had suggested the idea of relaxing the soft palate by cutting it completely away from its attachments at the posterior edge of the palate bones. This operation is very likely to prove abortive, from the division of the vessels which supply the flaps with nourishment; and even if it succeeds, it leaves an unnecessarily large aperture in the bones, still to be covered by artificial means. Being impressed by the very great proportion of the cases of cleft palate which were deemed incurable, I was led to perform an operation for the especial relief of the more extensive fissures, which include both the soft and hard palate. An account of this operation (Uraniscoplasty) and its results was published in the *New England Quarterly Journal of Medicine and Surgery* for April, 1843, and also in this Journal for the same year. This operation consisted in dissecting, or rather peeling up the soft parts from the roof of the mouth, as far back in bad cases as the alveolar processes, and then cutting away

by the same section the muscular attachments of the soft palate to the palate bones, thus making a continuous flap of the tissues, from the alveolar arch in front to the extremity of the uvula behind. In addition to this, being very much impressed by the violent character of the muscular contractions, which always caused so much trouble in the performance of the operation in the soft palate, and has given rise to the exercise of so much ingenuity in the invention of instruments for bringing together the edges of the fissure and securing the knots, I was led to the idea of cutting away the organs which are active in producing these effects. In this stage of the operation, which is also described in my paper of 1843, I first divide, with a pair of powerful curved scissors, the posterior pillar of the palate, which is made up chiefly of the palato-pharyngeus muscle. In case this does not effect a sufficient relaxation of the soft palate, by putting this organ on the stretch, the remaining muscles, which still confine by their action the sides of the fissure, will be felt in bold relief at the back part of the palate. This resisting mass is then divided by two or three cuts with the scissors, and immediately the half of the palate, which before the division was almost buried in the side of the throat, becomes flaccid and powerless. This section may be practised with advantage as well in cases where the fissure is simple as where it is complicated with fissure of the bones. In the latter case, if the fissure is very wide, it is often not advisable to attempt the dissection of the membrane from the whole hard palate, but it may be partially separated from its attachments to the bones at the back part of the fissure without disturbing it in front. By operating in this way, the edges of the soft palate can be easily approximated, and a plastic operation performed, "par glissement," which will in a measure also close the cleft in the bones. This, in fact, is the operation which I have chiefly practised of late years, from having found with what ease and efficiency an artificial plate can be adapted to cover the remaining small fissure of the bones, thus saving a very tedious and difficult part of the operation.

Some time after my first publication, Mr. Fergusson, the distinguished professor of surgery at King's College, London, published a paper upon Staphyloraphy in which he states that in addition to the division of the posterior pillar of the palate by means of the curved scissors, he also divides the levator palati muscle above the velum, using for the purpose a sharp-pointed curved knife passed through the fissure. This manœuvre confessedly involves some danger, in unskilful hands at least, of wounding the internal carotid artery,[1] and it complicates the operation by the unnecessary addition of a new instrument without effecting the division of the resisting muscles with any more thoroughness than had previously and has since been done in my operation with the scissors only.

Professor Langenbeck, of Berlin, has recently published a paper in

[1] See Fergusson's Practical Surgery, 3d edition, p. 612.

which he claims the invention of a new and important modification of the operation for fissure of the hard palate, from having insisted that the periosteum, as well as the mucous membrane, should be peeled off from the roof of the mouth. In my original paper I stated that "the mucous membrane of the hard palate is to be carefully separated from the bones with a long double-edged bistoury, curved on its flat side, and is rather peeled than dissected off, from the difficulty of making any sawing motion with the knife in this confined situation; the obstacles always being greater in proportion to the obliquity of the palatine vault." It will be seen from this description, that the only safety against the perforation of the flaps lies in keeping the knife close to the bone during the whole dissection, thus insuring the preservation, in connection with the flaps, of the greater part of the periosteum. Any one who will take the trouble to make a dissection of the hard palate may easily satisfy himself both that it is extremely difficult even in the dead subject, and still more so on the living, to split the soft tissues which cover it, and that it is also impossible to separate the whole periosteum cleanly from the rough and jagged protuberances which mark the oral surface of the palatine plate of the upper jaw.[1] It is therefore evident that the learned German professor has but accomplished the same results which I reported twenty years ago, and which have since been attained by many other surgeons, both in this country and in England.

The result of those operations may be stated briefly as follows. With the exception of perhaps half a dozen cases I have never failed to get more or less union of the soft palate. Sometimes one, or more rarely two, of the sutures have given way at the upper part where the tissues are put most fully on the stretch. If any of the stitches hold, however, and the smallest union takes place, it may be extended to any requisite degree by the application, at considerable intervals, of the solid nitrate of silver to the angle of the remaining fissure. The great point is to establish the arch of the soft palate, and after this is effected, artificial means can be used to cover up the remainder of the opening. Of course the more completely the fissure is closed by the operation, the better it is, but what I mean to say is that in the most extreme cases of very wide fissure, an operation can be performed which is as effectual in restoring the voice as in cases of fissure of the simplest character confined to the soft palate only. It is a curious fact that in one or two cases which I have seen of fissure extending but little further than through the uvula, the power of modulating the voice was as much impaired as in other cases where the fissure extended quite into the bones.

[1] See also papers upon this subject in the *Medical Times and Gazette* for January 18th, and February 8th, 1862. Also for structure of the coverings of the hard palate, see *Kölliker Gewebelehre des Menschen*, 3te Auflage, § 132, or the Sydenham Society's Translation, § 129.

The question is often asked of the surgeon whether the voice will be immediately restored by the operation, and if not, in what time the full restoration may be expected. The answer must, of course, be very indefinite; for in fact the patient has now to learn for the first time the art of using the palate in articulation. Almost every patient, after the opening is entirely closed, experiences a sense of relief, which is owing both to the greater ease with which deglutition is performed, and also to the protection afforded by the new palate to the mucous membrane of the posterior fauces, which, before the operation, was dry and parched from the constant passage of the air over it. Within the last few months I have had occasion to see several patients upon whom the operation was performed two or three years since. Two of them are teachers in public institutions, and the only defect to be perceived is a slight huskiness of the voice, which would hardly be noticed by any one ignorant of their former condition. I do not remember to have seen a case in which the patient was not benefited.

The hemorrhage which attends this operation is much less than might be expected from the very free incisions. These would at first sight seem likely to give rise to excessive bleeding, but I have never, even in the most vascular subjects, experienced any trouble: rinsing out the throat thoroughly with iced water is generally all that is needed. The same may be said in regard to the procedure necessary for the dissection of the mucous membrane from the hard palate. The time at which a vessel is apt to throw out a jet of blood is in cutting away the attachment of the reflected tendon of the tensor palati muscle where it joins the posterior margin of the palate bones, at which point some branches of one of the palatine arteries are generally divided. The bleeding, however, soon stops under the use of iced water, but, in one instance, where it continued after the sutures were adjusted, the upper stitch being very tense, and lifting the membrane up from the bone so as probably to prevent the retraction of the vessel, I was obliged to cut the stitch away, so as to allow the membrane to fall back upon the bone, when the bleeding at once ceased. In a case which I witnessed in the practice of another surgeon, the hemorrhage was quite abundant, and a solution of perchloride of iron was freely used both at the time of the operation and again when the bleeding returned some hours after. This application materially interfered with the union, although the case ultimately did well. I have never found it necessary, as has been recommended by some surgeons, to delay the adjustment of the sutures for any great length of time, in order to allow the bleeding to cease. A bit of ice held in the mouth after the edges are brought together has always been sufficient, with the single exception of the case here mentioned, in which it was necessary to cut away the upper stitch.

In the first few cases on which I operated, the patient was nourished by enemata for a few days immediately succeeding the operation. It was soon found, however, that abstinence from the use of liquids by the mouth was

followed by dryness and irritation of the fauces, which came near defeating the objects of the operation, and I was surprised to see how little danger there really is in permitting the patient the free use of liquid nourishment. In fact, the paralyzed condition of the muscles of the palate after their division prevents all danger of separation through their agency. After the first three or four days, an irritating cough is often brought on by the secretion of tough adhesive mucus in and around the wound. This cough is often so persistent as to threaten the destruction of the newly formed adhesions; it can sometimes be alleviated by the use of warm or acid drinks, or by brushing the surface of the wound gently with a weak solution of nitrate of silver.

At first I was disposed to begin to remove the sutures at the earliest possible period, but latterly, from having once had all the adhesions give way during the act of withdrawing them, I have allowed them to remain a very long time. It is rather important that the mouth should not be too widely opened during the early stages of the adhesive process; once, on the fifth or sixth day, I have known the entire wound to give way from the patient opening the mouth widely for the purpose of inspection.

I have tried one case of perfectly simple fissure in a child during the past year, without dividing the muscles. Everything looked fair after the operation, and it was the easiest and most promising case I have had for some years; the edges of the fissure came so easily together that I thought it unnecessary to add to the wound by the division of the muscles. The adhesions gave way about the seventh day, whether from the cause above stated, or from the child having taken solid food, or having committed some other imprudence, I am unable to say.

As to the proper age at which to operate—in one case of a fissure which extended but little more than through the uvula, I operated on a child of between six and seven years; but generally it is necessary to wait until the patient is old enough fully to appreciate the importance of the operation, and to submit patiently to pain and inconvenience, for this is one of the very few operations in which the use of anæsthetics is inadmissible. Under very peculiar circumstances, I suppose, ether might be administered, but not without some risk to the patient, and much embarrassment to the surgeon, from the constant flow of blood down the throat.

Of instruments especially designed for this operation, the forceps and "porte fil" are the most essential. The forceps, of which two pairs are required, are made with a double curve, adapted one to each side of the palate. They should have two teeth to each blade; the hinder blade, when the forceps are opened, being made to pass behind the palate, the construction of the instrument being such as to admit of the seizing of the extreme edge of the palate without taking a deeper hold upon its lower than on its upper surface. This, it will be seen, cannot be done by the common straight hooked forceps. The grasp should be sufficiently firm to control the palate

while the muscles are being divided, to which a very strong resistance is made. The strip of membrane upon the margin of the fissure can be removed without detaching the forceps from their first hold. The same process is repeated on the other side with the other pair of forceps. When this is finished, and the bleeding stopped by the use of a little iced water, the sutures are introduced. I have generally inserted the middle suture first, by that means controlling the palate, and thus rendering the insertion of the others easier. The lower one should be introduced last. The sutures used are single threads of surgeon's twist prepared by soaking, a day or two beforehand, according to a suggestion of my friend and former pupil Dr. Calvin G. Page, in the compound tincture of benzoin. By this means the silk acquires an adhesive property, which prevents its slipping when it is tied. In case the threads are not so prepared, they should be drawn partly through, wiped as dry as possible, and waxed at the point where the knot is to be tied. The thread should then be drawn suddenly back into the wound, brought together with a surgeon's knot, and this rapidly secured by a second one. In introducing the sutures I have found the needle of Schwerdt the most convenient instrument; the ligature is carried through the palate from behind forwards, the eye of the instrument is opened, the thread disengaged by means of a hook, and the needle withdrawn. At the lower part of the palate, where the parts are very movable, it is difficult to fix them with this instrument, and a simple curved needle held in a "porte aiguille" answers better. The chief objection to Schwerdt's "porte fil" is the difficulty of keeping it sharp, as the point being split, it is necessary to make it somewhat blunt to give it the requisite strength.

I have already stated that a heavy pair of French scissors curved on the flat side, is the instrument which I use for dividing the muscles. They should be made with great care, and the blades adjusted so as to cut perfectly true. For dissecting the soft parts from the hard palate, I use a spear-pointed knife with a short and broad blade curved on the flat side, the cutting part being about half an inch in length, the shank three inches long, the handle, large and roughened, four inches long. The membrane is partly cut and partly peeled off from the bones. It would at first seem probable that in this dissection of the tissues covering the hard palate, there would be danger of cutting off the palatine artery either where it emerges from the posterior palatine foramen or in its course along the roof of the mouth. I have not, however, met with this accident, and am inclined to believe that it is owing to the fact that the vessel is here protected by the groove sunk for it in the bone.

If the whole of the uvula is left, it is frequently brought in contact with the tongue in such a way as to produce cough and irritation of the throat; it also often becomes œdematous, and unites imperfectly. It is better, there-

fore, as a general rule, to remove the greater portion of it by the preliminary incisions.

I have to-day accidentally seen three cases of extreme fissure of both soft and hard palate. One, a woman of about thirty years of age, upon whom I operated about a year ago for a very wide fissure. Union of the soft palate was obtained to the extent of about an inch; the tension having been very great from the unusual deficiency of the soft parts. From a fear that her teeth were not sufficiently strong to afford a support to the plate, or from some other insufficient reason, she had deferred having an artificial plate introduced until the present time, and in fact was desirous that I should make the attempt to close the fissure in the bones, which was very wide, and had unusually shelving margins. This I told her I would attempt in case the aperture could not be covered in a satisfactory manner by artificial means. Dr. Rufus E. Dixon, who has made a great many such plates for patients upon whom I have operated, took a cast of the mouth and in about three days produced and fitted a plate to it. The effect was an immediate improvement in the speech, which became perfectly intelligible. In this case there are three facts deserving of notice. In the first place, the fissure extended through the lip, on the right side of the mouth, which is unusual, the arrest of development being almost always on the left side. The vomer was in this case continuous with the right palatine process of the maxillary bone. 2d. Before the operation, from some peculiar idea of her physician, the patient had starved herself for two or three weeks by way of preparation, probably with the idea of getting the stomach accustomed to the use of as little food as possible. 3d. From this reason, before the first incisions were completed, she became so faint as to make it difficult to proceed, and to render it necessary to administer stimulants; an ounce of brandy, or perhaps a little more, being given. The effect was, on an empty stomach unaccustomed to the use of spirits, that the operation was hardly resumed before she went into an apathetic state, from which it was almost impossible to arouse her, and it was only by the application of ammonia to the nostrils, cold to the head, and much energetic remonstrance, that she could be brought to a condition to admit of the completion of the operation. Soon after seeing this patient, a lady upon whom I had operated for a similar fissure two weeks since, came to me; the operation, so far as I had attempted it, having fully succeeded, and although the palate still remains somewhat red and tender, she is to go to-morrow to have a cast made, and will probably be able to wear the artificial plate in the course of the week. Shortly after this lady had left my house, a young man, twenty years of age, called on me, having been directed to do so by Dr. S. D. Townsend, who had very skilfully operated on his lip, many years ago, for a fissure attended with great separation of the bones. A very extensive dissection of the alæ of the nose and of the lip had been necessary to cover over the opening, and the

symmetry of the nose had been completely restored by the operation. The cleft in the alveolar arch was still very great, and there was also a wide fissure through the hard and soft palate. To remedy this deficiency, about a year since a very skilful dentist had made for him a gutta-percha palate, with two artificial teeth affixed to it, for the purpose of closing the gap in the alveolar arch. This covering extended quite back to the point in the fauces generally reached by the uvula; notwithstanding this his voice was wholly unintelligible, and he could not make me understand his name, until he wrote it. I mention this to show how essential the simple restoration of the arch of the palate is in articulation. In the present case I agreed to operate for this purpose in a few days.

A fourth case has also come under my notice within two days, as extreme as that last mentioned, and upon which I propose to operate shortly. The fissure extends through both the soft and hard palate, and the alveolar processes, and there is a wide hare-lip. This boy is 19 years old, and applied to me to have his lip operated on. As the large opening into the mouth afforded an uncommonly favourable opportunity for operating on the palate, I advised him strongly to have the latter operated on first, the idea of which had not before occurred to him.

Before terminating this paper, I would, in connection with it, make a few remarks on the operation for hare-lip, partly on account of its bearing on the operation for cleft palate, of which it is a very frequent complication. Dr. John Warren was an advocate of very early operation for this defect, and Dr. J. L. Peirson, of Salem, wrote a paper in which he urged the same thing strongly upon the profession. I have often done it at a very early age, and the result of my own experience is either to operate during the first twenty-four or forty-eight hours after birth, so that the child may be put to nurse as soon as the mother's milk is secreted, or else to defer the operation for a couple of weeks, until after the so-called icteric condition has passed, which frequently follows on the first few days after the birth of the child. In one instance in which I operated on a child, where the colour of the skin was so slight as not to attract my attention until after the operation, I at once perceived, on making the incisions, that the hemorrhage was greater than usual, proceeding, as it did, from the whole cut surface of the lip. The sutures were, however, introduced, and tied with great care, but in spite of styptic applications, the hemorrhage continued to such a degree as to endanger life, and it was found necessary at last to cut away the sutures, and to tie up piecemeal the whole margin of the fissure, leaving the opening much larger than before the operation. The wound did well, healing after the ligatures had come away. In this condition I left it, without any raw surface remaining, with the understanding that another operation could be performed at some future time. I did not see it again for five months, when, to my surprise, the child was shown to me without any appearance of a hare-lip. The parents said that contraction and coaptation of the

edges had commenced at the upper margin of the fissure, and had gradually extended until the entire opening had become obliterated. No scar appeared as after the usual operation, and the only indication that there had ever been a hare-lip was the slight looping up of the prolabium. When I first commenced practice, I adopted the French method of using sutures instead of pins, which had then been exclusively used in Boston, giving up bandages and sticking plaster as liable to cause irritation and to confine foul secretions, and I either made no application to the wound, or used merely a bit of linen or lint wet with water. I also introduced one stitch on the inner edge of the lip, cutting the ends of it very short. Finding that disordered digestion was of very frequent occurrence from giving up the natural method of nourishment by the breast and feeding the child with a spoon, even where the mother's milk itself was given, diarrhœa being brought on, and the process of repair interrupted and often destroyed by it, I was led to make the experiment of allowing the child to take the breast during the period of the cure, and I have had no cause to regret the trial. To my surprise I found that in the sucking process the edges of the fissure, instead of being drawn apart, as would naturally be expected, are, on the contrary, forced together in a way most favourable to their perfect coaptation.

BOSTON, May, 1863.

ART. II.—*Delayed Union of Fractures, with Cases and Illustrations; the Successful Employment of Malgaigne's Spike in connection with Drilling in a case which had previously resisted drilling employed by itself.* By DAVID PRINCE, M. D., of Jacksonville, Illinois. Read before the Annual Meeting of the Illinois State Medical Society, held in Jacksonville, May, 1863. (With six wood-cuts.)

WHILE fractures sometimes unite under the most adverse circumstances, at other times union is delayed or does not take place where the appearances are at first most favourable. This difference of results, independent of external circumstances, can only be accounted for by the assumption of constitutional differences of aptitude to bony formation. While ossification will sometimes extend through an inch or two of plasma, reaching from one fragment to another, the separation to the extent of one-fourth of an inch will at other times prevent the bony union of the fragments. While privation and starvation sometimes fail to retard union, there is in some constitutions a necessity for a liberal diet to afford the necessary stimulus to bony deposit. The antiphlogistic remedies for high inflammation, if continued unnecessarily long, may sometimes prevent union, while in other

instances no practical amount of local or general reduction will interfere with bony formation. While, therefore, it is never safe to omit any of the conditions of success in the treatment of fractures, the greatest number of unfavourable circumstances may be insufficient to cause failure if the ossific tendency be strong.

It is suspected that a fuller investigation will show that separation of the fragments to a distance of one-fourth of an inch or more from each other, and insufficiently nutritious diet at the period of from three to five weeks from the date of injury, are the most frequent causes of delay or absence of union. If this shall be affirmed by experience, it follows that the two most important points for the surgeon to attend to are, the apposition of the broken surfaces of the fragments, and the proper nourishment of the patient during the ordinary period of ossification. It must not be forgotten, however, that the extreme of fulness in diet may beget conditions of the system more dangerous and unwelcome than protracted non-union.

The delay having occurred, and the fragments remaining beyond the usual period, connected by soft callus of a greater or less degree of firmness, the treatment will at once suggest itself to secure local stimulation by frictions upon the skin, movement of the broken surfaces upon each other, a resort to more liberal diet, securing a better general health by exercise or exposure in the open air, and pressure upon the parts with reference to the approximation of the fragments when this is practicable, and when the delay may be suspected to depend upon the motion of the fragments upon each other, the diminution or arrest of this motion.

All these failing, some means of inducing more active capillary circulation with congestion or inflammation must be resorted to.

1. In the list of means to this end, is the passing of a seton through the callus between the fragments. This may be supposed to excite inflammation in all the parts immediately surrounding the seton, including the neighbouring periosteum. As an important point of treatment is to get the action of ossification started somewhere, in order to favour the propagation of this action through the fibrinous material constituting the callus, the treatment is based upon intelligible physiological principles.

From the known tendency of long-continued inflammation in and near the periosteum, to induce bony deposit, it may be that Dr. Physick was right in retaining the seton a long time, with the result of a protracted congestion in the neighbouring bone and periosteum. It may be in practice better to try the seton first for the short period, and, if that fails, to try it for the long period where this method of treatment is pursued.

2. The injection of some stimulating agent like iodine into or around the callus is founded on correct principles, but must be so extremely uncertain that in the possession of surer means it is not worth any further trials.

3. Electricity or galvanism passed through acupuncture needles introduced into the substance between the fragments, or in close proximity to

them, can only be expected to succeed by exciting hyperæmia or inflammation.

4. Opening the parts, and scraping or sawing off the ends of the fragments, converts the case into one resembling compound fracture; but in very old cases, in which the false joint resembles a capsular ligament with its inclosed synovial membrane and cavity, this severe proceeding may be necessary. In any case in which the duration of the false joint is not measured by years, it is not easy to conceive this process to be necessary.

Dieffenbach's method of drilling and introducing ivory plugs, leaving them there to excite suppuration, can hardly be conceived better than the seton carried through the soft callus between the bones, while the risk of necrosis must be a strong objection to the proceeding.

6. Brainard's method of drilling through the solid bones and their intermediate soft callus, so practising the operation as to permit the skin to slide over the opening when the drill has been withdrawn, has two theoretic recommendations. First, a very great disturbance of the particular portions of the bone drilled is effected, giving rise to the production of new plastic material for the formation of callus in the track of the drill, without the occurrence of suppurative inflammation. Suppuration here, as in the healing of other tissues, must be supposed to retard the union, though the active capillary circulation in the vicinity of its seat may result in subsequent ossification. The case may be thus stated: If the bony deposit can be induced by congestion or non-suppurative inflammation, it is more speedy than that brought about by suppurative inflammation. Yet there may be cases in which a long-continued inflammation with suppuration will induce the formation of bone after the failure of a shorter course of inflammation without suppuration.

In the cases in which there can be success by congestion or non-suppurative inflammation, suppuration is an evil retarding the result. In the other cases it is a necessary attendant upon the prolonged inflammation.

Second. When the operation results in the effusion of plastic lymph without suppuration, there are new centres of ossification in the chips of bone cut off by the drill. These are left in the track of the drill; some of them in the soft callus between the ends of the fragments.

That these minute fragments of bone become parts of the living tissue which organizes around them is certain; for, if they did not, they would, by the offensive emanations of dead bone, excite suppuration and work their way to the exterior. The importance of these little fragments cut off by the drill, as centres of ossification, may have received too little attention. As in crystallization the introduction of a single minute crystal may be sufficient to start a process which is backward to commence without catalytic aid, so the process of ossification, when slow to begin, may be set in operation by a fragment of bone or periosteum imbedded in the plastic

material. To obtain this advantage of the bony fragments it is, of course, necessary that suppuration in the track of the drill should be avoided.

7. Applying metallic wires around the fragments to approximate them and prevent lateral motion, answers an obvious indication. To apply a wire around the fragments, it is, however, necessary to convert the fracture into the condition of a compound fracture, and afterwards, when union has taken place, the wire is to be left in, or removed at the expense of much disturbance of the parts. If a silver, gold, or platinum wire becomes covered with organized lymph or granulations it can do no harm, and may be allowed permanently to remain.

8. Perhaps a bone might be drilled through both fragments and held in apposition by a rivet of one of these metals. The presence of the rivet after the completion of the healing process would do no harm, and if a permanent discharge should be the result the metal could be readily removed.

9. Metallic points arranged for pressure on one or more of the fragments for the purpose of approximating them.

This expedient, where the nature of the parts makes it practicable, supplies an important indication. It accomplishes all that can be secured by the application of wires with more certainty, without extensively disturbing the soft parts, and the apparatus is easily tightened or loosened, increasing or diminishing the pressure, and is easily removed altogether.

Whether the separation of the fragments has been occasioned by the action of muscle or by the interposition of muscle or other material, the pressure will be constant, tending continually to approximate them.

Malgaigne's single spike for oblique fracture of the lower portion of the tibia is intended to prevent what it may afterwards be employed to remove, *i. e.*, a too wide separation of the fragments. In this apparatus the counter pressure is by means of a strap passing round the leg, including a splint, which distributes the pressure upon the back of the leg. In other cases the counter pressure must be by means of opposing points acting upon the opposed fragments, in order to bring them into close contact. Skill in making and adjusting the apparatus will be chiefly exercised in making it occupy sufficiently small space not to be in the way of placing the limb alternately in various positions while the process of union is going on.

Wherever the application of pressure by metallic points penetrating the soft parts and pressing the bony fragments together becomes necessary, it would have been important to apply them in the first place to bring the fragments into close contact and favour union by what is termed by Paget *immediate union*, or by *primary adhesion*.

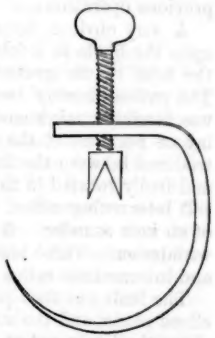
This is a new treatment, and the reason why it has not been adopted before this time is probably the repulsive appearance of the treatment to patients and friends. It is found by experience, however, that very little pain is occasioned by wearing for weeks a steel point applied with considerable force to the fragment to be held.

The treatment does not convert the fracture into the condition of a compound fracture, for the point can be applied at a sufficient distance from the place of fracture to avoid this complication. When, however, points have to be applied to opposite sides of the limb to act upon different fragments at the same time, they must be nearly or quite opposite each other; but as it is only in oblique fractures that the treatment is admissible, it will only in very rare cases be necessary to penetrate the interior wound in the soft parts.

In cases of compound fracture the points can be introduced into the wound or through the uninjured soft parts, as may be most convenient. This, as a first treatment of fracture, may be found to be less painful than apparently more comfortable modes of dressing, obviating the movement of one fragment upon the other by the closeness with which the surfaces are brought together. Some periosteal inflammation must be excited, which, if it extends to the fractured lines, can only the more certainly result in bony formation, whether as a primary treatment or as a method of curing non-union. A slight exfoliation of bone may occur at the spot where the metallic point is made to press; but this is a trifling consideration in comparison with an increased efficacy in the treatment.

A single point may be applied by means of the metallic yoke and strap, as employed by Malgaigne, and where two or more points are to be applied on opposite sides of the limb, an apparatus may be constructed resembling the clamp used by ladies to fasten to a table any fabric for greater convenience in sewing upon it, or like some forms of tourniquet made to apply opposing pads by means of a steel yoke approximated by some screw arrangement. The pads would for this purpose be replaced by points. The apparatus should be so arranged as to be capable of compressing the fragments as closely as may be necessary to keep them in apposition, and to hold them without any yielding whatever. There should be no elasticity in the retaining apparatus. (Fig. 1.)

Fig. 1.



Modification of Malgaigne's spike, employed for delayed union in oblique fractures.

If the pressure of the fragments upon each other is found to be painful to the patient, the screw may be loosened a very little, as a very small relaxation of pressure will be capable of affording relief.

CASE 1. *Non-Union of Tibia unsuccessfully treated by Drilling; afterwards successfully treated by Drilling followed by Compression of the Fragments by means of Malgaigne's Spike.*—Lt. Samuel L. Hamilton, Co. F, 19th Regt., Illinois Volunteers, on the 15th of May, 1862, had both fibula and tibia of the right leg broken a short distance above the

ankle by being thrown from a wagon, lighting upon his feet. He was treated in the army hospital, and the patient says his surgeons had considerable difficulty in keeping the bones in proper position.

After a few weeks a starch bandage was applied and the patient went upon crutches. The fibula united by bony material, but the tibia remained ununited. Some deformity existed from the action of the muscles, sliding the lower fragment upon the upper and bending the fibula, bringing the outside of the foot to the ground.

Operation under Ether by Drilling, after Brainard's Method, November 5th, 1863, five months and twenty days from the date of the injury:—

The fragments of the tibia were forcibly moved upon each other, and two holes were drilled through both fragments and the intermediate soft callus. The callus seemed from the jumping of the drill to be a quarter of an inch in thickness.

A side splint was applied, extending from the upper portion of the tibia over the malleolus, around which the limb was firmly bandaged. The fibula thus received the whole force of the bandage on one side, while upon the other side, the force of the bandage was received upon the malleolus, and the upper portion of the tibia by the intermedium of the splint. In two weeks the constant pressure had straightened the fibula so that there was no deformity. There was no perceptible motion between the fragments, and the splint was directed to be worn some time longer with the expectation of success.

This operation proved a failure, and the movement of the fragments upon each other became obvious enough.

Second Operation: Drilling and the Application of Malgaigne's Spike, March 11, 1863, ten months from the injury and four months from the previous operation:—

A very obvious deformity had been reproduced. The muscles acting upon the fibula as a fulcrum, had bent it so as to bring the outer side of the foot to the ground, while the inner side was slightly lifted from it. The patient having been brought under the influence of ether, the fibula was forcibly straightened by interstitial breaking, or by bending with breaking of portions of the substance; after which a quarter-inch drill was introduced between the fragments passing from below upward and backward, and freely rotated in the space between the two fragments breaking up the soft intervening callus. The fragments were thus shown to be one-quarter of an inch asunder. A small probe was introduced and left as the drill was withdrawn. Three holes were then drilled through the anterior fragment and intermediate callus and into the posterior or lower fragment.

The limb was then put upon a posterior splint which was a double inclined plane, and the steel-point of Malgaigne's spike placed about an inch above the lower end of the upper fragment through an incision made in the skin by a bistoury, the strap adjusted beneath the splint and the screw turned down until the probe left between the fragments was very firmly grasped by the approximation of the fragments. A light side splint was applied on each side within the yoke holding the spike. The probe was then pulled out from between the fragments.

With slight adjustments from time to time this apparatus was worn without removal twenty-eight days. The patient took opium enough during the first few days to quiet pain. He was overtaken with a chill to which he had for several months been subject, after which he had the consequent fever with a pulse of 120. He took quinia for this, and lager beer.

As soon as he was free from his ague he discontinued medicine. Considerable swelling and suppuration occurred around the spike which was not attended with much pain. The apparatus looked worse than it felt.

April 8. The twenty-eighth day removed the dressings and applied a tin side-splint.

17*th.* Applied a starch bandage, which was split on the 19th, and directed to be worn two weeks longer.

There is a node on the inner side of the tibia exactly opposite the point occupied by the spike as if periosteal inflammation had extended around the limb from the point of irritation by the spike. A few minute exfoliations afterwards came out in the vicinity of the point pressed upon by the spike. Consolidation followed this treatment, gradually imparting confidence to the patient who cautiously ventured to walk upon the limb. The patient left to rejoin the army the first of July.

Fig. 2.

Appearance of leg of Lieut. Hamilton, March 10, 1863.

Fig. 3.

Appearance of leg of Lieut. Hamilton, June 27, 1863.

(Engraved from photographs.)

CASE 2. *Ununited Fracture of Tibia and Fibula of three years' Duration, with much Angular Deformity from Contraction of Muscles. Reduction of Deformity by Extension and Lateral Pressure—Drilling the Bones according to Brainard's Method, resulting in Bony Union without Deformity or Lameness.*—Augustus Simpkins, of Pike County, Illinois, aged about thirty-five, had a simple transverse fracture of the middle portion of the tibia and fibula of the right leg, by the fall of a tree.

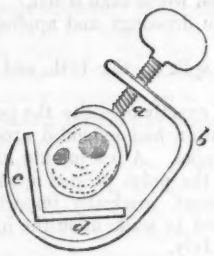
There is said to have been much swelling and inflammation, and the skin was cut to let out the effused fluids. Cold applications were kept upon the leg, and the patient restricted to a low diet. No union by bone followed, and the angular deformity—the foot being carried out, making the leg look like a limb with a knock-knee—resulted gradually from muscular contraction. When the patient stands erect the toes only come to the ground, the lower portion of the leg being at an angle of 45° with the upper.

June 12, 1861. The non-union has been of three years' duration.

Applied the most powerful extension practicable by the lever arrangement of Jarvis' adjuster attached to the distal end of a long splint, the counter-extension being upon the ischium and groin, while lateral pressure was applied by a sort of tourniquet working with a strong screw.

Forcible working of the ends of the bones upon each other was practised by taking hold of the limb with the hands, and the tendo-Achillis was divided. With all this the limb was not restored to its straight position, and the apparatus breaking under the great strain applied, the process was

Fig. 4.



a. Screw with its concave pad applied to the projecting angle of the leg *b.* Hook for retaining the screw, making counter-pressure upon the splints. *c.* Long splint, which is the medium of extension. *d.* Back splint attached to the long splint for aiding in securing the counter-lateral pressure.

stopped. The limb was dressed so as to retain as far as possible what had been gained.

After five days, not much inflammatory excitement had appeared, and the limb was subjected to another process. The bones were drilled from one fragment into the other in six places, taking different directions, all traversing the soft callus between the ends of the bones. The extension and lateral pressure were applied as in the first instance, only with stronger apparatus. The extension was from the ankle by means of a roller applied around it to hold the loops. The limb was not only straightened by this operation, but the muscular resistance was so completely overcome, that I bent the limb in the opposite direction without difficulty. The thigh, leg, and foot were then placed in a side splint, made of tin, and kept in it until the consolidation was complete, except when taken out for washing and friction to the skin.

In three weeks from the first operation he went home, a distance of forty miles, riding about half the distance in a buggy. The splint was worn about ten weeks. Perhaps it might have been laid aside sooner, but the patient, after his three years' experience, was afraid to trust his limb too soon.

During the operation a mixture of ether and chloroform was inhaled, and, to quiet the subsequent pain, morphia was freely administered. No other antiphlogistic treatment was resorted to than cathartics.

Fig. 5.

Fig. 6.

The above figures, engraved from photographs, represent the appearances of the limb, before treatment, Fig. 5; after treatment, Fig. 6.

The result in this case should lead us never to despair of success until after trials of means of cure. As the fracture of the tibia was transverse

the interposed substance was subjected to great pressure by the contraction of the muscles, and there was no want of apposition to account for the non-union. It is suspected that the antiphlogistic treatment was too long continued. The fragments of the fibula became overlapped as the limb assumed the angular position, but when brought into proper relations by straightening the limb the fragments became united by bony substance.

The preceding figures (Figs. 5 and 6) represent the conditions before and after treatment.

CASE 3. *Drilling the Callus only, unsuccessful; Bony Union afterwards induced by walking.*—In one case of simple oblique fracture of the upper portion of the lower third of the tibia and fibula by the falling of a tree, originally treated by me with great care by extension to avoid shortening or other deformity, the ossific union was delayed beyond the usual time. The callus was broken up by the insertion of a drill between the fragments of bone, but the hard bone was not drilled. This means failed up to the time when the patient, becoming impatient, placed himself in charge of another practitioner, who removed the splint and set the patient to exercising, bearing what weight he could upon the broken limb, after which bony union occurred with considerable deformity, the angle projecting forward.

CASE 4. *Drilling the Callus only; its influence doubtful, but the case successful.*—In another case of oblique simple fracture of the tibia with fracture of the fibula, ossific union was delayed beyond the usual length of time.

A drill was inserted between the fragments, and the diet made more liberal, after which union occurred without deformity.

The patient attributed the delay of union to the cutting off of his daily drinks of whiskey, and perhaps he was right. As the accident occurred while he was drunk, it seemed a good time to reform, but the moral the patient drew from the delay of union was unfavourable to reformation.

I am led to think that the perforation of the callus by awls or drills, which do not penetrate the bony substance, is useless, and perhaps worse than useless, by breaking up its organization without influencing the bone and periosteum, whence the process of bone formation most readily proceeds.

CASE 5. *Drilling the Bone.*—Thomas Mulready, an Irishman of short stature, aged about thirty, had an oblique fracture of the lower third of the tibia, beginning two and a half inches above the joint and extending upwards and backwards with fracture of fibula.

I first saw the case three months after the injury, when there was forward projection of the upper fragment of the tibia, with a shortening of an inch and three-quarters. The fibula had united.

Four holes were drilled through both fragments and the intermediate soft callus. Side splints made of cloth, saturated with an alcoholic solution of shellac, were applied and worn twenty-two days from the date of the perforation, when the fragments were found to have become consolidated. During a part of this time the patient was pretty well stimulated with whiskey and quinine.

The recovery was complete and permanent.

CASES 6 & 7. *Seton successful in two Cases.*—In 1848 I treated a case of non-union of the tibia successfully with the seton, and in 1851 a case of non-union of the humerus. In both these cases the seton was withdrawn at the end of two weeks, when the inflammatory action was supposed to be at its height. The success in both these cases was all that could be desired.

Summary. Seven Cases treated—two by Seton successful.—It is probable that the result is owing to increased vascular activity in the hard bone and periosteum, and not owing to any action set up in the callus itself.

Two by perforation of callus. This treatment is believed to be useless. The patients recovered, one from a resumption of his customary alcoholic stimulus, and the other from the stimulus of walking.

Three by drilling through the hard bone of both fragments. Two of these cases were successful on first trial; the other was unsuccessful at first, but afterwards successful when combined with compression by means of the metallic point impinging upon the projecting fragment.

Of the seven cases, all ultimately recovered; the two in which the callus was simply perforated would probably have done as well without the perforation.

Six of the cases were of the leg, and in all of them both bones were originally broken.

In four of the six cases the fibula united while the tibia remained ununited. In two cases the fibula remained ununited until the tibia finally united, but united at length without any treatment applied directly to the fibula itself. From this it appears that the fibula is more prone to unite than the tibia. Perhaps this is because the fracture is more likely to be transverse, on which account it is less subject to displacement, and because the tendinous and muscular investments hold the two fragments of the fibula together instead of tending to separate them, as is the case in oblique fractures of the middle and lower portions of the tibia.

One case of the middle portion of the humerus. The seven cases all ultimately successful.

NOTE.—June 30, 1863. I have now a case of oblique fracture at the junction of the middle and lower third of the tibia, extending from below and before upward and backward with fracture of the fibula—the fibula united, the tibia ununited—though the injury occurred twelve weeks since.

Four holes drilled transversely to the line of the fracture. The result remains to be seen.

ART. III.—*Cases showing the Influence of Living in the Open Air in the Treatment of Phthisis.* By JAMES BLAKE, M. D., Lond., F. R. C. S., of San Francisco, California.

THE following cases are published as furnishing some evidence of the influence of what may be termed the out-of-door plan of treating phthisis. They are not numerous, but as they include all the cases that have been submitted to the treatment in regard to which I have any certain data, they show a result which has never been obtained from any other plan of treating the disease. The treatment I have pursued has been to direct my patient to live entirely in the open air during the summer months, at an elevation of from three to five thousand feet above the sea, in our coast range of mountains, where the temperature is very equable, and no rain falls for five or six months. They are directed not even to sleep in tents, but out under the trees. Their diet was plain camp fare, sufficient game being found in the mountains to keep the camp supplied. Unfortunately, in no instance have I been enabled fully to carry out the plan of treatment, as the social position of my patients was such that they would only avail themselves of the facilities offered by our summer climate for living in the open air. Had they been able to pass the winter in Northern Mexico, where the winters are rainless and the winter climate in the mountains exactly the same as that of our coast range during the summer, I have no doubt that in every instance the disease would have been much more rapidly cured.

I shall now briefly relate the history of four cases which have been submitted to this out-of-door plan of treatment during the summer months, and of three others in which it has been carried out in a modified form. During the winter all the patients have lived in rather unfavourable hygienic conditions, as the cold damp fogs that occasionally prevail in the valley of the Sacramento at that season are prejudicial to phthisical subjects. In relating these cases, I shall allude more particularly to the gain in weight, as showing the influence of treatment on the progress of the disease. This is a symptom more evident and tangible than any other, and, as Dr. Cotton observes, "it seems to be a general rule that an increase of weight as the effect of treatment both proclaims its success and measures its extent. (*Cotton on Consumption*, 2d ed., p. 133.)

CASE 1. Mr. D——, æt. 36, bilious temperament, spare habit, consulted me in August, 1858. Had been coughing for some months, latterly hæmoptysis, but not to any great extent. Had lost twelve pounds in weight; pulse 98. Softened tubercles in right lung dull to nipple. As there still remained some weeks of summer weather, I advised him to go to the mountains and remain camped out as long as possible. The cough being troublesome, I ordered a mixture with nitromuriatic acid, creasote, and a small quantity of morphia. He had been taking cod-liver oil for

some months, which he was to continue. He remained out until the end of October, at which time he had gained seven pounds in weight. The cough was much improved; expectoration less. I did not see him until January, 1859. Dulness on percussion about the same; general strength improved; pulse 90. With careful hygienic treatment the disease advanced but little until March, when, from moving into a damp house, he had a violent attack of pneumonia, principally in the left lung, with a slighter attack in the right. This kept him in bed for three weeks, and it was a month longer before he could go out. After the acute disease had subsided, he was left with a cavity in the right lung and softening of the upper part of the left, dulness extending as low as the fourth rib. He left for the mountains in the month of May, having lost in weight during the winter about seven pounds, making his weight one hundred and forty-four pounds. He returned home in the month of September, having improved in strength, and having gained seven pounds in weight. He left the mountains sooner than I had advised, for, as he lived in a very malarious district, the valley of the Upper Sacramento, I was afraid he would have intermittent, which in fact he took. I did not see him again until the spring of 1860, when I found that the disease in the right lung was apparently quiescent, for, although a cavity still was there, there were no moist sounds. In the left lung the disease had progressed, as there was a cavity under the second rib, and two or three times during the winter it had been the seat of intercurrent inflammation. The pulse was 102, and, on the whole, I considered him in a worse condition than when I had last seen him. During the winter he had lost nine pounds in weight. The following summer was passed in the mountains, with a gain of seven pounds in weight. During the winter of 1860–61 he lost seven pounds, and the following summer he gained four pounds. In the winter of 1861–62 the loss in weight was six pounds, and during the last summer he gained eleven pounds, or more than he had gained during any previous summer. I have not seen Mr. D—— since the spring of 1860, but at my request he has observed the above facts in relation to his case, and as he is a good observer, and not at all oversanguine, every confidence can be placed in his statements.

In November, 1862, when furnishing me with the above figures as to his weight, he observes: "I still cough some in the morning, which is attended with slight expectoration. I believe my general health is better in comparison than my increased weight would indicate. I have placed much reliance in your advice as to the general course I should pursue, and now, after four years devoted to the restoration of my health in the manner you indicated, it is but just to say that my present state warrants stronger hopes of final recovery than it has at any previous time since I first consulted you."

CASE 2. Mr. J——, æt. 38. Saw him in March, 1860. He had then been confined to his bed some weeks by a violent attack of hæmoptysis, followed by pneumonia. Before this, he had been coughing and losing flesh for some months. The right lung was found to be extensively diseased, fully one-half of the lung being dull, and softening tubercles as low down as the fourth rib. The upper part of the left lung well-marked roughened expiration. By the end of May he had recovered sufficient strength to ride in a carriage, and I sent him out in the mountains. He returned towards the end of September, having gained fourteen pounds in weight. The cough had almost disappeared, and there was not more than

a teaspoonful of expectoration in twenty-four hours. There was a dry cavity found under the fourth rib of the right side, but no moist sounds were heard except just below the clavicle. The roughness of expiration had entirely disappeared from the left lung. The strength had improved in proportion to the gain in weight, as on the last days of the journey home Mr. J—— rode forty-three miles on horseback without over-fatigue. He had returned some weeks sooner than I had advised, and had an attack of intermittent fever. For this he took a trip up into the Sierra range, where he was caught in a snow storm and confined in a house for some days in very unfavourable hygienic conditions. During the winter the disease made some progress, and he lost ten pounds in weight. In the spring he went out into the coast range, and returned after two months, having gained five pounds in weight. He then went across the plains to the Eastern States, and I believe he died in the following June.

Case 3. Mr. W——, æt. 36, has been troubled with cough resulting from laryngeal disease for some years. In the fall of 1860 well-marked signs of tubercular deposit were found in the upper part of the left lung. During the winter the disease progressed, notwithstanding careful hygienic and medicinal treatment. In May, 1861, softening of the tubercles had taken place to a considerable extent, and the patient had lost about fifteen pounds in weight. The summer of 1861 was passed in the coast range of mountains, living entirely in the open air. In November the patient returned, having gained ten pounds in weight, and although there was still considerable cough from the laryngeal affection, yet the expectoration had nearly ceased, and no moist sounds were heard in the lung. The area of dulness had very much decreased, and rough slightly-blowing respiration was heard where muco-crepitant sounds had been noticed. The winter of 1861–62 was a very severe one in this State, and was passed by Mr. W—— in very unfavourable hygienic conditions. The disease progressed, and there was a loss of weight of seven pounds. I have not seen the patient since March, 1862, but I understand the disease is progressing, although I cannot obtain any correct data as to his present condition.

Case 4. Mr. R——, æt. 37. Was not a patient of mine, but spent the summer of 1862 in the mountains with the last patient, Mr. W——. I have no doubt but that he was suffering from phthisis in the third stage, as I had daily opportunities of seeing him, and his chest had been examined by one of our best physicians, who pronounced the case to be phthisis. He had been coughing for more than a year, had lost forty pounds in weight, and was so reduced in strength that when he started to go to the mountains he could not go up a flight of stairs without stopping once or twice to recover his breath. After passing the summer in the mountains, he had gained by October nineteen pounds in weight, the cough had almost gone, and there was but little expectoration. Since this time he has been following his profession, that of a lawyer, but under most favourable hygienic conditions, as his residence is in one of the valleys of the coast range, and he takes a great deal of out-of-door exercise, and lives most rationally. In November, 1862, he wrote me: "My health has gradually improved since my return, and I attribute it entirely to out-of-door exercise and other hygienic means. I weigh now, after a hot summer, one hundred and fifty pounds" (his weight when he went out was one hundred and thirty-six, and when he returned one hundred and fifty-five pounds) "and shall probably increase to one hundred and sixty-five pounds during the winter."

I saw Mr. R—— on the 4th of January, 1863. He informed me that he had gained eight pounds in weight since he wrote me, that he only coughed a little morning and evening, and that he could walk up hill without difficulty. His pulse then (5 P. M.) was 82.

The following table exhibits the gain in weight in these four cases during the time they lived in the open air on the mountains:—

CASE 1.—Health weight, 156 pounds.

Softened tubercles in one lung.

1858. Aug.	144 lbs.	Nov. 151 lbs.	Increase, 7 lbs.

Cavity in one lung, tubercles in the other.

1859. April,	142 lbs.	Nov. 151 lbs.	Increase, 9 lbs.

Cavity in each lung.

1860. April,	142 lbs.	Nov. 149 lbs.	Increase, 7 lbs.
1861. April,	142 "	Nov. 146 "	" 4 "
1862. April,	140 "	Nov. 151 "	" 11 "

CASE 2.—Health weight, 144 pounds.

Cavity in one lung.

1860. April,	119 lbs.	Nov. 133 lbs.	Increase, 14 lbs.
1861. April,	123 "	July, 128 "	" 5 "

CASE 3.—Health weight, 138 pounds.

Softened tubercles in one lung.

1861. April,	121 lbs.	Nov. 131 lbs.	Increase, 10 lbs.

CASE 4.—Health weight, 176 pounds.

Cavity in one lung.

1861. April,	136 lbs.	Nov. 155 lbs.	Increase, 19 lbs.

Following his profession.

1863.		Jan. 158 lbs.	Increase, 3 lbs.

I will now relate the history of three cases in which the open air treatment was only partially carried out, but in which rapid improvement took place. These, however, are selected cases, or, unfortunately, rather cases which have been treated with the best hygienic and medical means, but in which a mountain residence in the open air could not be had, have gradually gone on to a fatal termination.

CASE 5. Mr. C., æt. 32, sanguineous temperament, consulted me in January, 1856. Had been coughing for some months, and had lost thirty-three pounds in weight. Left lung extensively diseased; muco-crepitant râle heard as low as fifth rib, and strong indications of a cavity under the clavicle. The sputa contained a great deal of softened tubercle; cough very troublesome; pulse 98. I advised a trip to the Sandwich Islands to pass the remainder of the winter, prescribing cod-liver oil, iron and morphia, good diet and bitter ale. (The patient before had been on low diet and expectorants.) Rapid improvement took place during the voyage out and home; weight when he started one hundred and fourteen pounds; at the end of April on his return, one hundred and forty-seven. The cough was very much less. Unfortunately, I had no opportunity of examining the lungs. The next summer was passed in the mountains, at an elevation of about twenty-five hundred feet. I have not had an opportunity of seeing him since, but in December, 1862, he writes me: "I have hardly been troubled with cough since my return from the islands. I am enjoying good health, and at the present time weigh one hundred and fifty-two

pounds." Hygienic rules are carefully observed by him, and as his residence is at an elevation of about twenty-five hundred feet, he has not been subjected to any malarious causes of disease.

CASE 6. Mr. A., æt. 29, large framed, hemo-phlegmatic temperament, consulted me in October, 1856. Subject to a cough for some winters, and strong family predisposition to the disease. Last summer, his health deteriorated from working in mines, where, according to his account, the air must have been extremely foul. About six weeks before I saw him he took cold, and must have had an attack of subacute pneumonia. Has been coughing and expectorating a great deal more ever since; has lost upwards of thirty pounds in weight during the last six months. Extensive dulness and moist rattles in right lung; left lung sound; pulse 102; tongue flabby and coated. As he had to gain his living, I advised him to shoot game for the market, as thus he could pass the most of his time in the open air. Having been used to exposure, he was told to sleep in an open shed, except in stormy weather, and as the winter was a fine one, there were but few days in which he could not live almost out of doors. In the way of medical treatment, he was ordered an emetic of sulphate of zinc and ipecac. every third day;[1] bitter infusions to restore the tone of his stomach, and cod-liver oil and iron when his stomach would bear it. Under this treatment he improved rapidly, so that at the end of four months he had gained twenty-two pounds in weight, and was coughing but very little. Against my advice, he returned to his quartz leads in the spring, and on the following winter, the disease progressing, he placed himself under the care of a hydropathist, and after being packed in wet sheets for three months, he was carefully enveloped in one that was dry, before being taken to the cemetery.

CASE 7. J. M. D., æt. 36, consulted me in November, 1859; has had a cough, and been losing flesh for the last twelve months, having lost fourteen pounds in weight. Muco-purulent expectoration; has had no hæmoptysis. On examining the chest I found movements of right side much restricted, and moist râles on that side as low as third rib; roughened expiratory sound on upper part of left lung; cough troublesome at night; pulse 96, 3 P. M. Although it was in November, I hoped a careful hygienic treatment might enable him to keep up until the spring without change of climate, and accordingly I put him on wholesome diet, as much out-of-door exercise on horseback as he could stand, and well-ventilated rooms. He took tinct. ferri, small doses of morphia and cod-liver oil. During the winter he improved slightly, having gained by the end of February two pounds in weight and considerable strength; there was less cough and expectoration, but no appreciable difference in the stethoscopic signs. Early in March he left the city to superintend the construction of a road across the Sierra, and was exposed during the two following months to some very rough weather in the shape of snow and rain storms, at an elevation of four or five thousand feet, and with very imperfect shelter. From the time he left the valley, his health began rapidly to improve. During the whole of the summer, he was camping out with the party constructing the telegraph from here to Salt Lake, and by the autumn had entirely lost his

[1] When clinical clerk to the late Dr. Anthony Todd Thompson, at University College Hospital, emetics in phthisis were quite the fashion, and I certainly have seen benefit derived from them, probably, however, only in cases in which they were useful in improving the digestive organs.

cough; had gained sixteen pounds in weight, and considered himself quite well. Since then he has led an active life, having been a great part of the time in the mountains and on the plains beyond the Sierra (the elevation of the plains is from four to five thousand feet). He enjoys perfect health, having had no cough during the two last winters, and his weight is some pounds greater than it was before he was taken sick.

Such are the facts which I have to bring forward as showing what can be effected in cases of phthisis by the out-of-door treatment of the disease. Case 1 was a bad one, and must probably have terminated fatally in the spring or summer of '61, had it not been for the treatment pursued. Even at the present time the patient is not well, but the greater increase in weight during the last summer, as compared with the gain during any previous summer, gives room to hope that the patient is outgrowing the tendency to the disease, and that perfect recovery will be the result. Case No. 4, when submitted to treatment, was an extremely unpromising one, but it now bids fair to be eventually cured. There is at present but slight cough in the morning; no difficulty in ascending hills, and there has been a steady increase in weight even during the present winter. In Case 3, the issue is doubtful; besides the pulmonary disease, this patient has been troubled for some years with an affection of the larynx, which keeps up a constant cough. The gain of ten pounds in weight by a person whose health weight is only one hundred and thirty-six pounds, notwithstanding this laryngeal affection, is a satisfactory proof of the influence of the treatment on the course of the pulmonary disease. Case 2 terminated fatally, but the influence of the treatment on this case during the first summer he camped out was most marked. After the treatment was given up, and the patient returned to the Eastern States, the disease advanced rapidly, and ended fatally in a few months.

In the above sketch of seven cases of well-marked phthisis it will be seen that there are three in which the disease had advanced to its third stage and four in which it was at the second stage. Of the cases in the third stage one has died, having stopped the treatment and returned to the Eastern States. Of the others one has been gradually improving during an interval of four years, and will I believe ultimately recover. The other, after an interval of three years, is almost well, having during the last two years been attending to his business, as a lawyer, without inconvenience, improving in health and slowly gaining in weight. Of the other four cases in which the disease had advanced only to the second stage, two are certainly cured; one (case five) has been free from any pulmonary symptoms during the last five winters, and the other (case seven) has been entirely free from cough during the last eighteen months, and is now enjoying better health than he has had for some years. Of the other two, case six has died, having substituted wet sheets for living in the open air. Of the case with the laryngeal affection I have no certain data, but I believe the

disease is slowly progressing, treatment having been neglected during the last summer. In each of the three cases in which the disease had advanced to the third stage, improvement must be ascribed to the hygienic advantages secured by living in the open air, under most favourable conditions as regards elevation, climate, and wholesome nourishing diet, as in all three, careful treatment under ordinary conditions had failed to arrest the progress of the disease. The same remarks will apply to case three, in which there was only softening. In the other three cases, in which the disease had advanced only to the second stage, improvement took place whilst the treatment was being carried out in a modified form. In each case living in the open air as much as possible was, I believe, the most important element in the treatment, although this was carried out under less favourable conditions than can be found, to our coast range at an elevation of three or four thousand feet.

I have to apologize for the imperfect manner in which the results of some of these cases are reported, from my having had to trust to written communications from some of my patients as to their present condition. But in so unsettled a population as that of California, it was impossible to obtain this information in any other way. I have reported no case in which I had not satisfied myself of the existence of the disease. I have seen many others in which I have not the least doubt but that the disease has been cured by living out on the plains for some months; but on these I possess no certain data. Their scientific value is slight, although they sufficed to lead me to adopt the plan of treatment that has led to such favourable results. I am sure also that physicians who have been residing on the western frontier for some years must have seen many cases in which they *knew* the disease had been arrested and even cured, by one or two years' residence amongst the Indians and trappers of the Rocky Mountains.

Unfortunately but few localities afford facilities for fully carrying out this plan of treatment. Certainly in no other part of the globe can it be more readily tried than on this coast. For six months in the year we have a rainless climate, during the whole of which time our patients can live in the open air, under the most favourable hygienic conditions, and when the rainy season here would drive them into houses, a sea voyage of four or five days brings them to Northern Mexico, where, during the winter months, they can enjoy a climate exactly analogous to our summer climate here, as in that country rain only falls between June and October. The intervening months being absolutely rainless. I have seen cases of consumption, in which a winter's residence there has been most beneficial, and I have a patient wintering there at present, who is reported as improving rapidly, although the disease had advanced to the third stage. When our patients are in a position to avail themselves of the advantages of the summer climate of California, and of the winter climate of Mexico, I believe there are few cases, except those in which the destruction of lung

tissue is already too extensive, that cannot be cured. Many cases, both in the first and second stages, can be cured by merely passing the summer out of doors in this country, but even in these, I believe wintering in Mexico would very much shorten the treatment. In all cases that have advanced to the third stage, wintering in Mexico should be recommended, as the treatment is much prolonged by the aggravation of the symptoms, during the time that the open air treatment has to be suspended. Every case, however, must be treated on its own merits; the time and means required for restoration to health, being more dependent on the general pathological and diathetic condition of the patient, than on the amount of change that has taken place in the lungs.

It is not my intention at present to enter on the questions of pathology and treatment which the above facts naturally suggest. This I hope to do on some future occasion. Their most important bearing I believe is, the support they bring to the views of those who place their chief reliance on the hygienic treatment of the disease. How striking a confirmation do these facts offer of the remark of Dr. Richardson, who, in his work on Consumption, observes:—

"In a cozy room the consumptive is bound never to live, nor in any room indeed, for any great length of time. So long as he is able to be out of doors, he is in his best and safest home. In the fields, on the hills, wherever the fresh air vivifies, where plants look most vigorous, and animals frisk about in the joy of health, there will the consumptive draw in his choicest medicine, there dissolve and throw off most freely the germs of his disease, and there repair most easily the tissues he has lost."—*The Hygienic Treatment of Pulmonary Consumption.* By Benjamin W. Richardson, M. D. Page 8.

ART. IV.—*On the Organic Nitrogenized Principles of the Body, with a New Method for their Estimation in the Blood.* By AUSTIN FLINT, JR., M. D., Professor of Physiology and Microscopy in the Bellevue Hospital Medical College, New York, and in the Long Island College Hospital.

PART I. *Composition and Properties of the Organic Nitrogenized Principles of the Body.*—The physiological investigator of the present day is greatly dependent upon Chemistry as a means of ascertaining the functions of the body; so much so, indeed, that these departments cannot be separated from each other, and it is to Physiological Chemistry we must look for the solution of questions of the highest importance which yet remain unanswered. Among the various questions which thus remain to be answered by the Chemist, that of the quantity, composition, condition of existence, and changes, of the organic nitrogenized principles is the most

important; for these apparently are the constituents of the body endowed with vital properties; they regulate the changes which take place in the other principles, and the various modifications which they undergo in the body constitutes the mysterious "life," the comprehension of which has not yet been granted to the student of Nature. Though chemistry has enabled us to make but little, if any, progress towards the solution of the great question of vitality, it has helped us to comprehend certain of the phenomena of living bodies; and by long searching we have found out some of the laws which regulated their phenomena. The results of the physiological labours of centuries have only confirmed a great principle which must be recognized by every one who hopes to make any advance in this science.

The laws which regulate animated nature are irrevocably fixed; as distinct from those which govern inanimate objects as life is from death. They must be sought for by a patient study of the phenomena of life till the chain of evidence is complete. The mind must seek to comprehend, not to create.

Much ineffectual labour has resulted from a lack of comprehension of this great principle. While Physiology was comparatively new as a science, many endeavoured to establish laws for the regulation of the economy instead of adding to our knowledge of phenomena; and others, ignorant of the fact that what is true of inanimate matter cannot be applied to the living body, endeavoured to explain everything by physical or chemical laws. To this latter circumstance may be attributed the want of application of chemistry to physiology until within the last few years; though, in all ages, when learning has been cultivated, chemistry has been a favourite study. They who took such pride in the discovery of elements, and the establishment of physical laws, could not bring themselves to admit, and cannot, at the present day even, that the body is anything but a collection of those elements regulated by the laws with which they were familiar; while they who saw these laws so often violated in living bodies, were disposed to reject entirely chemical and physical explanations of physiological phenomena. Hence arose the classes of vital and chemical physiologists. To make use of chemistry, from which physiology had so much to expect, it was necessary to create a new mode of study which should have reference to organic substances, and to substances not necessarily chemical elements, but formed from these elements, which are now called *Proximate Principles*. It will be seen at once how important are these principles with reference to their condition and behaviour in the living body, and how necessary it is to study them from this point of view, and not simply as inorganic or inanimate compounds.

There is thus a manifest difference between a proximate principle and a chemical element. The former has certain properties in the living body which are different from any known in the inorganic world. They may

be properties peculiar to animal substances, such as albumen or musculine, which are endowed in living bodies with the vital properties of continual destruction and reparation; or the substance may be inorganic, as water or chloride of sodium, but actually entering into the composition of organized tissues, and participating in the peculiar vital changes which they undergo. The latter is an indivisible substance, possessing no power of self-regeneration, forming definite compounds by unison with other elements of the same class, by which union the properties of all the components are radically changed. Chemical elements can be studied, and have been studied for years, without reference to organized or living structures, though these are formed necessarily of such elements, and as such have been found to possess certain definite properties. When the chemist, in investigating organic bodies, studies only the ultimate elements of which they are composed, he learns nothing more of the properties of these elements, for they are identical with those he extracts from inorganic substances. He gives us simply the results of decomposition of the body; while, what we wish to know, is, the function of the systems and organs, and the elements which compose the tissues of the body. The ultimate composition of organic bodies is manifestly of little importance compared with a knowledge of their physiological properties; unless, indeed, this should explain their function, a hope of the chemist which is rarely realized. Thus the body cannot advantageously be studied from a purely chemical point of view; and the changes which take place, even in its inorganic constituents, cannot be explained by formulæ which indicate simply the addition or subtraction of certain elements. Within a few years a great advance has been made in physiological chemistry by a modification of the mode of study of organic principles. The most rational investigators of the present day treat them as compound substances, which cannot be decomposed without destroying their properties. But a still further advance is necessary: they must be considered, not merely as proximate principles, which can be separated from the body by means which do not interfere with their chemical composition, but as principles capable of performing their functions only when united together, as they certainly are in Nature. For example, what has been considered as albumen, that is, dried albumen, is incapable of performing its function if it be not united with water, chloride of sodium, and other inorganic substances which are always found in connection with it; and though it be interesting to know its ultimate composition, and its behaviour on the application of heat, in the presence of acids, etc. etc., these phenomena are artificial, and useful only as tests; while our true line of inquiry lies in a study of its behaviour in the body, and the investigation of natural, rather than artificial phenomena. Instead of attempting to isolate it completely, we should rather study its union with the other principles by which it is enabled to perform its functions; and when we separate it from the animal fluids in order to ascertain its proportionate quantity, we should separate with it those other sub-

stances which are united with it in the living body, without which it can perform no vital functions. We shall see that some of these substances, as water, actually enter into the composition of the organic principles, and cannot be separated without alteration and decomposition.

These preliminary remarks explain why I consider it of the greatest importance to study, first of all, *the condition under which organic substances exist in the body;* more especially as this question is almost ignored by physiologists. We shall find that, to correspond with the ideas I shall present upon this important question, a new method of estimating the quantity of these substances will be necessary, as the analyses which we now have are the work of chemists who have not appreciated their condition of existence. In discussing this question, it will be necessary to review to some extent the opinions and analyses of chemists which are accepted at the present time.

Ultimate Composition of Organic Nitrogenized Substances.—According to the present received views, every tissue of the body, and all the fluids, with the exception of the excrementitious fluids, contain a characteristic element, which is found in no other situation, and which gives to it certain properties connected with nutrition, which may be called vital. Generally, these tissues and organized fluids contain but one characteristic organic element, which takes its name, with the termination *ine*, from the situation in which it is found. Thus *musculine* is the organic element characteristic of muscular tissue; *osteine*, of bony tissue; *cartilagine*, of cartilage: and among the fluids we have *pancreatine* for the pancreatic juice; *mucosine* for the mucus. With the exceptions of the blood and milk, there is but one such element to each tissue or fluid. The blood, however, which furnishes the material for the formation of all these substances, contains several organic substances, *i. e.*, *fibrin*, *albumen*,[1] and globuline; and the milk contains, in addition to *caseine*, a trace of albumen. Though it is probable that all the tissues and organized fluids (excrementitious fluids excepted) contain elements of this kind which are characteristic and present shades of difference for each one, they have not yet all been separated sufficiently for purposes of study; and, according to Robin and Verdeil, only seventeen can be regarded as well established.[2]

List of Organic Nitrogenized Substances.

Name.	Where found.
Fibrin	Blood, chyle, lymph.
Albumen	Blood, chyle, lymph, serum, milk.
Albuminose	Chyme, blood.
Caseine	Milk.
Mucosine	Mucus.

[1] These are called by the French Fibrine and Albumine, but they are more commonly known in English as Fibrin and Albumen.

[2] Traité de Chimie Anatomique, etc., par Ch. Robin et F. Verdeil. Paris, 1853.

Name.	Where found.
Pancreatine	Pancreatic juice.
Globuline	Blood-globules.
Muscuiine	Muscles.
Osteine	Bone.
Cartilageine	Cartilage.
Elasticine	Elastic tissue.
Keratine	Nails, hair, epidermis.
Crystalline	Crystalline lens.
Hematine	Colouring matter of the blood.
Biliverdine	" " " bile.
Urosacine	" " " urine.
Melanine	" " " pigment.

Of the seventeen principles above enumerated, only three have been studied with any degree of accuracy; namely, fibrin, albumen, and caseine. The proportion of these elements in the fluids in which they have been found has been carefully estimated, and, in addition, much pains have been bestowed upon their ultimate analysis. Albumen, the one with which we are most familiar, has given the name to all these substances, from similarity, as far as known, of composition, &c., and the remainder, thus called *albuminoids*, have been simply indicated in the situations above enumerated, no attempt having been made, with one or two unimportant exceptions, to estimate their quantity or ascertain their ultimate composition. In fine, the blood and the milk are about the only fluids of the body which have been subjected to critical analysis for organic substances; and hardly anything has been done with the solids. I do not propose in this article, to take up the chemistry of the milk, and, throwing out this fluid, I am reduced in my examination of analyses to the organic elements of the blood, which has justly claimed the most careful investigation at the hands of the physiological chemist.

In the latter part of the last century, Berthollet discovered the existence of nitrogen in organic bodies. Before his time chemists had little idea of their composition. It was known that they were very unstable, and the discovery of the above-named ingredient offered a supposed explanation of this fact; *i. e.*, that its presence engendered a number of "attractions" which did not operate in bodies of a less complicated composition. This discovery was a great step in the chemical knowledge of organic substances of this class; and the researches of investigators since that time have so far established it, that they are known generally under the name of *nitrogenized*, or *azotized* principles. The organic matters were then closely studied by Dumas, especially those existing in the blood; and, indeed, the mode of analysis of this fluid for its organic ingredients employed by Dumas forty years ago, is the one adopted, with but slight modifications, by che-

[1] These are simply colouring matters, and are put by Robin and Verdeil in this class, as they contain nitrogen.

mists of the present day. He ascertained, in the first place, the amount of water which could be driven off from the blood, and attributed it all to the serum, considering the fibrin and albumen as held in solution by this water, and the globules as possessing no fluid of their own. By appropriate means, which will be considered hereafter, he separated the fibrin, albumen, and globules, evaporated them to dryness, and estimated them in this condition. The ultimate composition of these principles was not then definitely ascertained, and no theory of the mode of union of their elements or their formation was proposed. A few years later (1837), in connection with Liebig, Dumas proposed a division of chemical science into inorganic or mineral, and organic. According to the theory thus proposed, all inorganic bodies were composed of two elements directly combined, forming what they called binary compounds, which again united with other compounds formed in the same way. Thus, potassium and oxygen united to form potash (KO), which, in its turn, may unite with another binary compound, as nitric acid (NO_5), to form nitrate of potash (KO,NO_5); the elements first uniting together to form pairs, which, in their turn, unite with each other. In inorganic chemistry the union of elements proceeds, in this simple manner, to form the most complex substances; an element can only unite with an element, a binary compound with a binary compound, and so on. Organic, particularly vegetable substances, on the contrary, were theoretically reduced to the compounds of a radical which, though itself a compound, behaved towards elementary substances in the same way as a simple inorganic element. In other words, the behaviour of these so-called organic radicals in their union with elementary substances would lead us to suppose them to be elements themselves; it is only chemical analysis which shows them to be compound. For example, cyanogen will unite with hydrogen to form hydrocyanic acid (HCy), as chlorine will unite with hydrogen forming hydrochloric acid (HCl). The latter is an inorganic or mineral acid, and the chlorine, which is the radical, is of necessity an elementary substance; but cyanogen, the radical of the organic acid, though it unites with the element hydrogen in the same way as the chlorine, behaving like an elementary substance, is found by chemical analysis to be a compound of carbon and nitrogen (C_2N). It is in reality a radical, but compound, and a compound radical is a thing unknown in inorganic chemistry. The example just given shows a marked difference in the behaviour of inorganic and organic substances, as the radical C_2N, or cyanogen, actually exists and conducts itself, as we have seen, not as a compound, but an elementary substance; and if all organic compounds could be shown to be formed of compound radicals, this would constitute a true distinction between mineral and organic combinations. But this is not the case; though some chemists have theoretically reduced alcohol, ether, acetic acid, and in fact all organic vegetable compounds, to a union of elements with compound radicals, the radicals, unlike cyanogen, are hypothetical. It is said, for example, that the radical ethyle

(C^4H^5) unites with oxygen to form the oxide of ethyle (C^4H^5O), which is ether; with oxygen and an equivalent of water, to form the hydrated oxide of ethyle (C^4H^5O+HO), in alcohol, etc. etc., but ethyle never exists in nature, and cannot be manufactured. The same is true of the radicals, methyle, acetyle, benzoile, ammonium, &c. The hypothetical character of these radicals is universally acknowledged,[1] and the theory of compound organic radicals, though it may serve to explain the composition of certain classes of organic bodies, is not universally received by chemists of the present day; it is rather a mathematical analysis than an actual investigation of real substances; for, with the exception of one or two, *all the radicals are hypothetical.* This wholesale assumption of imaginary substances violates, *in toto*, the principle enunciated at the beginning of this article. Instead of studying the phenomena of organic bodies, phenomena are imagined and facts distorted to correspond to the laws which are known to regulate the behaviour of inorganic substances. But it is beyond the scope of this paper to treat of these purely chemical questions; the reason the theory of organic radicals has been discussed at all is, that it was followed the next year, 1838, by the theory of Mulder, by which he attempted to explain the constitution of the albuminoids. He supposed all organic nitrogenized substances in the body to be formed by the union of certain elements with a radical, *proteine*, giving to them the name of proteine compounds. This hypothesis was adopted by Liebig, Dumas, and Simon, and is now accepted by many physiologists. It is then one of the most important questions which we have to discuss in studying the composition of organic nitrogenized bodies.

Proteine.—As before remarked, the only albuminoids that have been carefully studied are fibrin, albumen, and caseine. In addition to a great similarity in the general properties of these substances, ultimate analysis has shown a remarkable likeness in chemical composition. It is not to be wondered at, then, that an attempt should be made to reduce all the compounds of this class to a series derived from a common radical, following upon the theory of organic vegetable radicals, which was first pretty generally received. This was done by Mulder; who, treating albumen, fibrin, or caseine with alcohol and ether to remove the fats, and with hydrochloric acid to remove inorganic salts, dissolved these substances, thus purified, in a solution of potash, and precipitated by acetic acid a substance said to possess always the same characters, which he called the radical of the albuminoids, and which, by union with a certain quantity of sulphur and phosphorus, was capable of forming fibrin, albumen, or caseine. This, which is merely

[1] For a *résumé* of the history of these so-called organic radicals the reader is referred to a lecture by M. Auguste Cahours, published by the Société Chimique de Paris, 1860, p. 51.

an extension of the theory of compound organic radicals into animal chemistry, has a more plausible basis than in the formation of vegetable organic compounds. The supposed radical proteine was obtained and analyzed by Mulder; and if it could be definitely established to be the same for the various substances from which it is extracted, and if these substances could be shown to consist always of this radical with a definite proportion of sulphur, or sulphur and phosphorus, the theory would be sustained, as far as possible with our present means of investigation. It is true it would only be sustained by analysis, but synthesis cannot yet, if indeed it ever can, be applied to animal chemistry; for we have thus far been unable to construct a single organic principle of the body out of its elements. But the proteine theory is not susceptible of analytical demonstration. The composition of proteine itself is not definitely settled; and when we come to review the methods of ultimate organic analysis, we will see that the varied results obtained by chemists do not depend on a want of accurate means of analysis, but upon the indefinite characters of the compounds themselves. Let us take, for example, the analyses of Mulder[1] showing the composition of the proteine groups, and compare them with the results obtained by other chemists!

Mulder gives the following formulæ for the proteine group:—

$C^{40}H^{31}N^5O^{12}$ = Proteine.
$C^{40}H^{31}N^5O^{12} + SPh\frac{1}{2}$ = Fibrin and albumen of white of egg.
$C^{40}H^{31}N^5O^{12} + S^2Ph\frac{1}{2}$ = Albumen of serum.
$C^{40}H^{31}N^5O^{12} + S$ = Caseine.

This analysis of Mulder has been confirmed by Schröder and Von Laer.[2]

Regnault gives as the constitution of proteine $C^{36}H^{23}N^4O^{10}$;[3] Sheerer, $C^{45}H^{72}N^{12}O^{14}$;[4] Liebig, $C^{48}H^{36}N^6O^{12}$; and Dumas, $C^{36}H^{35}N^8O^{17}$.[5]

The composition of fibrin, albumen, and caseine given by Dalton, and credited to Liebig, is as follows:—[6]

Fibrin = $C^{256}H^{228}N^{40}O^{92}S^2$
Albumen = $C^{216}H^{169}N^{27}O^{68}S^2$
Caseine = $C^{288}H^{225}N^{36}O^{90}S^2$

Denis, in a paper presented to the Academy of Sciences at Paris in 1839, advanced the view that fibrin and albumen are identical in composition; which view was sustained by Liebig in a note to the Academy in 1841.[7]

[1] Robin and Verdeil, Chimie Anatomique, tome i. p. 652.

[2] Animal Chemistry with reference to the Physiology and Pathology of Man. By Dr. J. Franz Simon. Philadelphia, 1846.

[3] Cours Elémentaire de Chimie, etc. Par M. V. Regnault. Paris, 1853, tome iv. page 114.

[4] Milne-Edwards. Leçons sur la Physiologie, etc. Paris, 1857, tome i. p. 151.

[5] Robin and Verdeil, op. cit., tome i. p. 651.

[6] Dalton's Treatise on Human Physiology. Second edition. Philadelphia, 1861, p. 80; and Robin and Verdeil, op. cit., tome iii. p. 147.

[7] Robin and Verdeil, op. cit., tome iii. p. 282.

With this diversity of opinion among chemists, based on actual analysis, it is impossible to come to any other conclusion than the following:—

There is no evidence that fibrin, albumen, and caseine are formed by the union of a *definite proportion* of phosphorus and sulphur with a common radical.

In addition it is certain, if we attach any weight to ultimate analyses, that the properties of these substances do not depend entirely on their chemical composition. If we look at the analyses of Mulder, even, we find that two substances as dissimilar as it is possible for substances of this class to be, namely, albumen of the white of egg and fibrin, have the same ultimate composition. The minute composition then does not seem to be important as regards the general properties of the compound. Let us now see whether this composition be invariable or not; whether, in other words, these compounds are not of *indefinite chemical composition.*

Notwithstanding all the labour which has been bestowed upon the ultimate analysis of the substances under consideration, the question of their composition does not seem to be one of any great importance. The difficulties of such an analysis, and, as we have just seen, the contradictory results in the hands of skilful chemists, show that a knowledge of the ultimate composition of organic nitrogenized substances is of little value as a means of distinguishing them from each other; and such an analysis throws no light whatever on their function in the economy. A careful review of the facts which have been accumulated on this subject leads to the conclusion that *these bodies are of indefinite chemical composition.* In the first place they are not crystallizable; secondly, they may be made to assume different forms and properties by the action of imponderable agents, as in coagulation by heat or galvanism, without losing or gaining any elements; thirdly, they are in a continual state of change, in nutrition during life, without losing their properties, and will continue to absorb oxygen and exhale carbonic acid for some time after removal from the body,[1] and shortly after these properties have ceased, undergo the changes of putrefaction; lastly, there is no great difference between them in chemical composition, and almost all the analyses made by chemists of equal skill present great variations. Is there not, then, every support for the assertion that their chemical composition is indefinite? Either this assertion is correct, or the methods of analysis employed are inaccurate. As so much depends upon this point, I will venture to give a rapid sketch of the method of analysis most commonly employed by chemists.

It is first ascertained, by a very simple process, that a given substance,

[1] G. Liebig has demonstrated the fact that the muscles of the frog will continue to absorb oxygen and exhale carbonic acid after they have been separated from the body, so long as they retain their contractility. Lehmann's *Physiological Chemistry*, Philadelphia edition, vol. ii. p. 474.

say albumen, is composed of certain elements, as carbon, hydrogen, oxygen, nitrogen, sulphur, and phosphorus. This being determined, it is deprived of moisture; the fat is removed by ether and alcohol; and the earthy salts, as far as possible, by dilute hydrochloric acid. A carefully weighed quantity is then decomposed, and the proportions of these elements determined, in the following way:—

Mode of Analysis.—A tube of the hardest glass, a half an inch in diameter, sixteen to eighteen inches long, and closed in a flame at one end, is used for the decomposition, which is effected by combustion. The oxidation is effected by means of the black oxide of copper, which is prepared for the purpose perfectly pure, carefully powdered, and freed from every particle of moisture. The tube is first filled for two or three inches with pure oxide of copper. The organic matter is now to be carefully powdered, incorporated with oxide of copper (it is best to employ from five to eight grains of organic matter for the analysis), taking care that not a particle be lost, and the mixture introduced into the tube. The tube is now to be filled to within an inch of the extremity with the pure oxide of copper.

In performing this part of the manipulation, care should be taken to remove all moisture, as this would affect the quantity of hydrogen obtained from the combustion. This may be done by attaching the tube, after it has been filled, to one opening of a small air-pump, such as is used for this purpose, the other being fitted to a bent tube filled with pumice stone and sulphuric acid. By placing the combustion tube in a long dish filled with warm water and exhausting the air a few times, all the moisture may be removed.

As the tube is to be subjected to considerable heat, it is best to wind it with a narrow ribbon of sheet brass, which will prevent its bending when it becomes softened. We now attach to the open end, by a smaller tube fitted perfectly with a cork, a light tubular apparatus filled with small fragments of chloride of calcium, the tube and its contents having been previously weighed, and we connect with this a series of bulbs, called Liebig's potash bulbs, partly filled with a solution of caustic potash, which is likewise carefully weighed. The heat may now be applied to the combustion tube, which may be done in a long glass furnace made for the purpose, or by surrounding it, well supported in a long iron trough, with hot coals. The heat is applied gradually, beginning at the nearer end of the combustion tube. The organic substance is thus completely decomposed, and if it were composed of carbon, hydrogen, and oxygen, like sugar, the analysis would be complete—this combustion giving us the carbon and hydrogen, and the oxygen being obtained by difference. As it is, all the hydrogen is converted into watery vapour, which is absorbed by the chloride of calcium, and the carbon, converted into carbonic acid, is absorbed by the potash. The weight of these products is ascertained by taking the increase

of weight of the calcium tube and the potash bulbs, and the quantities of *carbon* and *hydrogen* are deduced therefrom.

We have now remaining the nitrogen and sulphur. We may use the same tube, with a little modification, for carbon, hydrogen, and nitrogen; but it is better to estimate the latter in a new apparatus. For this purpose we take a combustion tube similar to the one just described, placing at the closed end a few grains of bicarbonate of soda; then the oxide of copper as before; next the mixture of oxide of copper and the organic matter; next another layer of pure oxide of copper, and last of all a layer of pure copper reduced by hydrogen. The extremity is then connected with one opening of the air-pump, and to the other is adapted a tube which opens under a receiver containing mercury with a solution of potash floating on the top. We then exhaust the air as completely as possible and connect the combustion tube with the receiver by opening both stopcocks of the air-pump. It is necessary now to drive out all the air from the apparatus, as we wish to collect the nitrogen in a gaseous form. For this purpose we apply the coals to the further extremity of the tube, when the heat decomposes the bicarbonate, and carbonic acid gas is evolved. We see that all the air is driven off, by the complete absorption of the gas evolved by the potash in the receiver, showing that pure carbonic acid is coming over. We then substitute another receiver filled with mercury and a solution of potash, withdraw the heat from the bicarbonate, and apply it gradually from the anterior portion of the tube as before. Combustion of the organic matter takes place, which results in watery vapour, carbonic acid, which is absorbed by the potash in the receiver, and nitrogen, which passes over and is collected in a gaseous form. Some of the nitrogen is oxidized by this combustion, but as it passes over the hot metallic copper in the nearer extremity of the tube, the oxygen is retained and the nitrogen passes over pure. After the combustion of the organic matter is complete we again apply heat to the bicarbonate of soda so as to drive off what nitrogen remains in the tube by the evolution of carbonic acid. We then remove the receiver, substitute water for the mercury, measure the volume of the gas, taking the temperature carefully and bringing the level of the water in the tube to that of the surrounding liquid; thence deduce its weight, which gives us the proportion of *nitrogen*.

The sulphur and phosphorus, if there be any, exist in very small quantity. They may be estimated in the albuminoids without any great difficulty, by causing them to unite with soda, as sulphuric or phosphoric acid, and then precipitating with the chloride of barium for the sulphur, and by a process a little more complicated, but not less exact, for the phosphorus, which it is not necessary to describe here.[1]

[1] An admirably clear exposition of the whole process for the analysis of organic substances, with all the precautions for making it perfectly accurate, is found in Regnault's *Cours Elémentaire de Chimie*, tome iv. p. 9 et seq.

We have thus obtained the weight, in a given portion of albumen, of all its ingredients but the oxygen, *i. e.*, carbon, hydrogen, nitrogen, and sulphur. By subtracting the sum of the weights of these substances from the whole weight, we have the oxygen; and reducing to 100 parts we have the ultimate composition.

I have given the process rather fully, to show how, with certain precautions, in the hands of one skilled in chemical manipulations, it may be made as accurate as any operation in inorganic chemistry. With a balance that will turn with less than $\frac{1}{1000}$ of a gramme, and with care to avoid moisture, etc., in the apparatus, the result should be always the same, if the substance analyzed had always the same composition.

The next step is to establish the formula in equivalents. If the substance used were an acid or a base, which combined with any substance of known combining equivalent, this would be easily done, by getting the weight of a combining atom by experiment, calculating the proportions of its ingredients to this weight, and dividing the quantity of each element thus obtained by its combining equivalent. But in the case of the albuminoids, which are neutral, this cannot be done.[1] A formula is calculated for them which ex-

[1] The following extract from a note from Prof. B. Silliman, Jr., of New Haven, which he has kindly permitted me to publish, gives the views of this eminent chemist on the important question of the determination of formulæ for the albuminoids.

"If I understood correctly your inquiry the other day respecting the formulæ of the albuminoid substances, the difficulty in your mind was, to determine on what principle a given formula was selected from a certain ratio of numbers. There is, in truth, a serious difficulty in stating the formulæ of all organic bodies; but there are, nevertheless, certain general rules which guide the chemist in such cases. Take, for example, the composition of *alcohol*, the commonly received formula of which is $C_4H_6O_2$. The percentage composition is of course very easily ascertained from this formula, thus

$$C_4 \quad H_6 \quad O_2.$$
$$24 + 6 + 16 = 46.$$

$46 : 24 = 100 : x = 52.18$ per cent. of Carbon.
$46 : 6 = 100 : x = 13.04$ " " " Hydrogen.
$46 : 16 = 100 : x = 34.78$ " " " Oxygen.

"But it is plain that any multiple or submultiple, of the established formula for alcohol will present the same *ratio*; thus we may have

$C_2 H_3 O$
$C_4 H_6 O_2$
$C_6 H_9 O_3$
$C_8 H_{12} O_4$, &c.

"Which shall we select? Usually the simplest, or that which gives the smallest number of whole equivalents. But in case of bodies which, like alcohol, are volatile, we have a specific guide in the *vapour density*, which will vary, of course,

presses the elements in the simplest manner so as to give no fraction, and generally giving an even number for the atoms of carbon.[1] Thus Liebig gives the formula of fibrin $C^{208}\ H^{103}\ N^{40}\ O^{59}\ S^{12}$.

This review of the mode of ultimate analysis of organic nitrogenized bodies, makes it evident to any one in the slightest degree conversant with chemical manipulations, that the contradictory results obtained by different chemists are not due to imperfections in the analytical process; indeed, the process is acknowledged by chemists generally to be as accurate as that for the determination of the composition of inorganic substances. The only way, then, to explain the contradictory results obtained by different chemists of equal skill and reputation, is to assume that the chemical composition of the principles is indefinite. While enough has been said to convince the reader of this fact, it follows that important results are to be expected rather from a study of the condition and behaviour of these substances in the economy, than their decomposition into elements. When they have been extracted from the body, they are by no means in the condition under which they normally exist. This being the case, it is for the physiological chemist to give their quantity, properties, etc., as far as he can, *in the condition in which they really exist in life;* the physiologist then takes them and studies the vital phenomena in which they are concerned. Here comes the important question: *What is the condition of existence of the organic nitrogenized elements in the body?* On the answer to this question depends the mode of proximate analysis of the organized fluids of the body, especially the blood, which is all important to the physiologist.

Condition of Existence of Organic Nitrogenized Substances in the Body.—In the ordinary proximate analysis of the blood, by which is meant

with the number of equivalents, and serves as a definite control over the symbol or formula.

"As regards the composition of the albuminoids, you will remark that they are all derivatives of cellulose by removal of three equivalents of water, and the substitution of three equivalents of the elements of ammonia. Thus $C_{24}H_{20}O_{20}+3NH_3=6H_2O_2+C_{24}H_{17}N_3$. This view, first presented in 1845, in my *First Principles of Chemistry*, by Mr. Hunt (pp. 512, 513, edition of 1852), coincides in a very remarkable manner with the best analyses of fibrin and protein by Mulder. By it protein is a nytril or amid of Cellulose, and in accordance with this, when protein is dissolved in concentrated hot chlorhydric acid, it yields ammonia (as sal ammoniac), water and a brown insoluble substance identical with that resulting from the slow decay of wood. This view for a long time lay unregarded, but lately has been brought out again as new by Dusart and other continental chemists. (See *Am. Journ. Sci.*, 1848, vol. v. p. 74; 1862, vol. xxxiii. p. 113.) I commend this subject as therein set forth to your perusal.

"In a physiological point of view, as an example of the results of vital chemistry, the production of albuminoid bodies from cellulose, has always appeared to me to be one of the most interesting topics in organic chemistry."

[1] Regnault, Chimie, op. cit., tom. iv. p. 54.

an analysis giving the proportions of proximate principles without any reference to their ultimate composition, the albumen and fibrin are put down in a very small proportion. Fibrin is recognized by its spontaneous coagulability, and albumen by its coagulability by heat and nitric acid; and we know that the fibrin may be extracted from the blood coagulated on rods, and the albumen of the serum solidified by heat or nitric acid, in quantities which are evidently much greater than those given in analyses. The physician finds it difficult to reconcile to his ideas of albumen and fibrin of the blood, the proportions of sixty to sixty-five parts per thousand for albumen, and two and a half for fibrin. The reason why the estimates fall so far below our ideas, is, that chemists never have estimated the fibrin and albumen as they are separated from the fluids by coagulation, which only changes their form and not their weight; but after separating them in this way, have subjected them to perfect desiccation. We have therefore not the weight of the principles as they exist, not the fibrin and albumen which are calculated to nourish the body, but the desiccated substance, altered, and its properties destroyed, by this process. Physiologists tell us that fibrin and albumen are in solution in the water of the blood, and that their natural condition, in a state of purity, is that of a dry powder. In this case it is extremely difficult to reduce these substances to their natural condition. When we coagulate them, which, according to this view, is a precipitation, a large quantity of water persistently remains in combination with them which it is very difficult to get rid of, and when got rid of, the dry substance must be weighed quickly and with many precautions, to avoid a resorption of moisture. Other matters are also found combined with the coagulated organic substance. All the salts which are found in the blood are united with it as well as the water; and in the proximate analysis, these salts are not generally separated from the organic substance before it is weighed. This view, which is almost universally held by physiologists, is the one which has guided all the analyses which we have of the organized fluids. In the original works to which I have access, that of Robin and Verdeil, on Anatomical Chemistry,[1] is the only one in which I find any dissent from the prevailing doctrine. They regard the organic elements of the fluids as naturally fluid and not in solution; those of the semi-solids as naturally semi-solid; and of the solids as solid. The contrary view seems to me radically and entirely wrong; and all analyses of the organized fluids, made with the idea that organic substances are in solution, fail to give anything like a correct idea of the properties of these substances. The analyses of the blood which are embodied in the latter part of this paper, are the only ones, as far as I know, which have been attempted with reference to the real condition, as it seems to me, of the organic constituents. They have been made on the following principle:—

The water which is contained in coagulated organic substances, which

[1] Op. cit., tom. iii. p. 121.

may be driven off by dry heat, &c., is not part of the water which held the organic matter in solution, but an actual constituent of the substance, as much as the carbon, hydrogen, or nitrogen, and indispensable to the properties by which we recognize it as an organic principle.

It has already been shown that ultimate analysis does not give us an idea of the distinctive characters of different organic matter. For this we must depend upon certain characters which are found in all principles of this class, and further, upon certain properties which serve to distinguish them one from another; and when deprived of their water of composition by desiccation, neither in their general properties nor in chemical composition do we have any means of recognizing them, unless it be, by their indefinite chemical composition and the impossibility of making them assume a definite or crystalline form.

First, with regard to their general properties. They all undergo a change peculiar to themselves, called putrefaction. This property, which is the one perhaps most distinctive of organic matter, is abolished when they are deprived, even partially, of water; a fact which is well known and of which we have a familiar example in the preservation of meat. Again, when an organic substance is in a state of putrefaction, it is capable of inducing the same change in other elements of this class by what is called catalysis, or acting as a ferment. As water is necessary to putrefaction, it is consequently necessary to the development of this property. Principles of this class also undergo a change peculiar to themselves in cooking; which is characterized by the development of volatile empyreumatic substances. Water is necessary to this change, for if exposed to heat after water has been driven off, as has already been seen in the study of the mode of ultimate analysis, they are resolved into their elements without undergoing any such change. They also are capable of regaining their water of composition after desiccation, possessing to an eminent degree what is called the property of hygrometricity, by which they are returned to the condition they assumed when first coagulated. This coagulability is also a peculiar property, and entirely different from precipitation from a solution. They cannot be redissolved in the fluid from which they are separated by coagulation. For example, albumen, and indeed all of them are insoluble in alcohol; but if albumen be coagulated by alcohol, and afterwards freed from it, it cannot be redissolved by pure water, or the fluid from which it was separated. When once coagulated they have undergone a change, and cannot be redissolved except by means which change them still more. When they have been coagulated and dried, reduced to what is called a condition of purity, they cannot be redissolved and detected by their property of coagulation, for they are changed, and consequently not in their natural condition.

When we are asked what we mean by fibrin, we answer that it is an organic constituent of the blood, which possesses the property of coagulating

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when removed from the body, giving this property to the whole mass of blood, which separates, after a time, into clot and serum. We would define albumen as a principle of the same class, existing in the serum, which is coagulated by heat or nitric acid. These are naturally fluid, but coagulate, in the one instance spontaneously, and in the other by the means just mentioned. We cannot say that they are principles composed of so many atoms of carbon, nitrogen, &c., because their composition is indefinite. If asked the proportion of these principles contained in the blood, we can only say that after they have been separated from this fluid, and after all their water has been driven off, there have been found 2½ parts of fibrin, and 60 or 70 of albumen per 1000. This latter answer conveys to us no idea of the real quantity, for we care nothing about the quantity of anhydrous matter contained in these substances, we wish to know the quantity of *coagulating* fibrin and albumen found in the blood. Analyses giving the quantities of these substances as near as possible in their natural condition, have never been made, though they would seem the only ones which could convey any definite idea of what we wish to know. I have attempted to supply this deficiency, to a certain extent, in Part II., on the Analysis of the Blood, or at least to show what we wish to ascertain.

I have enumerated about all the properties by which we recognize organic nitrogenized substances, separated from the living organism, as a class; namely, putrefaction, the property of becoming ferments, changes in coction, desiccation, hygrometricity, and coagulation; and all of these depend on the presence of water. Should we not, then, almost conclude from these facts that water is a necessary and very important element of their constitution? It is true that it is separated with great facility, and that its union with the other ingredients is not very powerful; but this is no argument against the fact of its being in a state of positive union. There are many substances in the inorganic world which have a union no more powerful than that of water in organic matters. Take the single example of the bicarbonate of soda. The second equivalent of carbonic acid is driven off by a gentle heat, and even by exposure to the air at the ordinary temperature, leaving the salt in the condition of a carbonate.

There is another circumstance in connection with the mode of union of water with other ingredients to form an organic body which serves to distinguish it from mere solution. When a solid substance, as a salt, is in solution in any fluid, it requires a certain quantity of the fluid to dissolve a certain quantity of the solid, but beyond this the fluid may be increased indefinitely; the solid having the same relation of solution to the whole mass. On the contrary, when one chemical compound, as sulphuric acid, unites with another, as with soda, one equivalent of the one combines with one equivalent of the other, and if more of either one be added, it does not enter into combination. Now I regard the organic substances found in the fluids of the body as naturally fluid, and mixed with the other fluids; the water

which enters into their composition, as represented by the water which they contain when separated from the other fluids by coagulation; and this quantity of water, though not absolutely definite, is as definite in its proportion as the other ingredients. It is restricted within definite limits; and though, when fluid, like many other fluids, it may be mixed with an indefinite quantity of water, when separated by coagulation water will always be found in about the same proportion.

There is another point of view, by far the most important physiologically, from which we must study this question of the natural condition of the organic ingredients of the fluids. Do they conduct themselves in the vital operations of nutrition like the inorganic substances, which are undoubtedly held in solution, or like substances naturally fluid?

This question seems to me very easily answered. The processes of nutrition of the organic elements of the body consist in a change of the fluid organic substances, principally the albumen and fibrin, into those which are semi-solid and solid, like musculine, osteine, etc. In the process of these changes, water is of course absolutely necessary, and is deposited with the other elements of the organic matter. It, as well as the carbon, hydrogen, oxygen, and nitrogen, is necessary to the constitution of the musculine and osteine, and is involved in all the catalytic changes of nutrition.

Having special reference to the blood, and the organic substances which it contains, the relations between this fluid and the tissues constitute one of the most important and interesting of physiological inquiries. In the organic elements of the solids and semi-solids of the body reside, undoubtedly, the vital properties which lead them to regenerate themselves at the expense of the circulating fluid; and in the tissues and organs, as well as the blood, the organic matters are always united with inorganic salts, as well as water. Of these salts, some, in connection with organic matter, go in great measure to make up the tissues, as the phosphate of lime in the bones; while others seem by their presence to regulate somewhat the nutritive processes, like the chloride of sodium, which is more abundant in the blood than in any of the tissues. It is an invariable law that organic nitrogenized principles, whether fluid, semi-solid, or solid, never exist alone, but always in combination with inorganic substances. It is impossible, indeed, in extracting the organic substances from the body, to free them entirely from inorganic salts; and the fibrin and albumen of the blood I have found to contain all of the salts which exist in that fluid. The blood contains all of the elements, both organic and inorganic, which are necessary for the regeneration of the tissues. The inorganic elements are deposited unchanged, and in the organic elements alone resides that property of mutual convertibility which forms musculine, cartilagine, osteine, etc., out of albumen and fibrin. In this process of change we have a deposition of the salts, which cannot take place by itself, but must be involved in the deposition of organic matter. This process is not to be explained by the

laws of chemical attraction, nor represented by a change in chemical formulæ. It is an act which takes place only in organic living bodies, and the more we attempt to elucidate it by investigations of a purely chemical nature, the further we remove ourselves from a comprehension of the essence of nutrition. We must learn to look on processes like this as physiological and not chemical; and as we never have constructed, and perhaps never will construct, a single organic nutritive substance out of its elements, nor changed one into another, so we will ever fail to comprehend the phenomena of change and the mystery of their construction in the body, if we persist in endeavouring to adapt these phenomena to the laws which regulate the composition and changes of inorganic substances. When we study the composition of these substances, we should take them as we find them, and not try to reduce them to a condition approximating that of minerals. The absence of useful results following the labours in this direction of so many chemists should be a warning to us to quit the beaten track. When we study their properties, we have already seen that it is necessary to take them as they are, combined with water, or these properties are lost. When we come finally to study their vital functions in the economy, we find that they not only contain water, but inorganic substances, which are indispensable to the great function of nutrition, and which cannot be separated from the organic. We must in this study recognize the following important facts.

First. Organic nitrogenized substances are the only elements of the body in which reside the properties of destruction and regeneration during life. Fats, sugar, and inorganic salts operate with them, and by virtue of this property, which we may call vital.

Second. They are of indefinite chemical composition; and no physiological importance is to be attached to ultimate analyses. They are unstable; in a state of continual change during life, and soon alter after death, or after being removed from the body.

Third. They assume the consistence of the tissue or fluid in which they exist. They are solid in the solids, like bone; semi-solid in the semi-solids, like muscle; fluid in the fluids, like the blood. They are not dissolved in water, but water is an ingredient, and its quantity determines their consistence.

Fourth. In the body they never exist alone, but always combined with inorganic substances, which accompany them in the changes they undergo in the processes of nutrition and destructive assimilation.

Fifth. As all the proximate analyses of the organized fluids, particularly the blood, have been made with the idea that the organic ingredients were solids in solution in water, these quantitative analyses give, not the proportion of fibrin or albumen, but dried fibrin and albumen, the original substance subjected to a process which drives off its most important constituent, and which alters its properties. Such analyses, as representing real quantities, are erroneous.

PART II. *Analysis of the Blood with special reference to its Organic Constituents.*—From the review we have given of the organic constituents of the body, and the intimate relation we have seen to exist between the tissues and the blood, it becomes evident that an analysis of this great nutritive fluid, especially with reference to its organic constituents, is of the highest interest and importance. This fact has long been recognized, and of late years a great part of the labours of investigators in physiological chemistry have been devoted to this subject. It is not my purpose here to consider any but the organic principles of the blood. The constitution of this fluid, in its entire physiological and pathological relations, is too extended a theme to be considered in this place. The fact that the blood contains certain excrementitious substances shows that this fluid is connected with the waste as well as the repair of the system. The pathological importance of this has been settled experimentally by the discovery of the accumulation of these excrementitious elements in the circulating fluid, giving rise to certain pathological conditions; as, for example, the urea, producing a condition of the system known under the name of uremia; and more lately, the discovery of the character of cholesterine as an excretion and its accumulation in the blood, under certain conditions of the liver, constituting cholesteremia.[1] These are only two examples where diseased conditions of the system have been clearly shown to depend upon the accumulation of a specific excrementitious substance in the blood, acting as a poison; but the work in this direction is but begun; and I venture to predict that more light will be thrown on pathology by the discovery of new poisons in the blood, dependent on defective excretion, than by any other line of experimental inquiry. There are already some known excrementitious substances, creatine and creatinine, for example, of the pathological relations of which we are entirely ignorant; and we must look to these and other elements of this class, which may be discovered hereafter, for light on the pathology of many diseases now obscure.

The proximate analyses of the blood up to this time, have been made under the supposition that the organic matters, fibrin and albumen, were solid elements in solution; but according to the views advanced in Part I, namely, that their real condition is one of fluidity, and that when deprived of water they lose one of their most important ingredients, this mode of analysis is inadmissible. The real quantities of fibrin and albumen can no more be represented by the residue of evaporation, than by the residue of calcination, which would leave only inorganic matter. Before giving, however, the processes by which I have attempted to estimate the quantities of *undried* fibrin, albumen, and globules in the circulating fluid, let us take a rapid review of the methods of proximate analysis which are now generally employed.

[1] See an article on a "New Excretory Function of the Liver," by the author, published in the number of this Journal for October, 1862.

Berzelius, followed soon after by Marcet, gave us the first quantitative analyses of the blood. He analyzed the serum of the human blood, and indicated certain quantities of albumen, lactate of soda, muriate of soda, etc. He put the quantity of dried albumen at 80 parts per 1000, which is about the proportion given in the analyses of chemists of the present day. His researches were published in 1808, and were followed by the analyses of Marcet in 1811, which gave about the same results. In 1823, Provost and Dumas published their researches on the composition of the circulating fluid, with a full account of their process. This process, with slight modifications, is the one employed generally at the present time. The following are the principal steps in the analysis of these eminent investigators: The fibrin is separated from a weighed quantity of blood by whipping with a bundle of broom-corn, carefully collected, dried, and weighed. Another specimen of blood is set aside to coagulate, and after it has fully separated into clot and serum, the clot is dried and weighed; the proportion of fibrin ascertained by the first specimen is subtracted, which gives the quantity of dried globules. The serum is then evaporated to dryness, the residue extracted thoroughly with boiling water, ether, and hot alcohol to remove the inorganic salts and fat, and afterwards weighed, which gives the proportion of albumen. The fats are easily extracted with ether, and the inorganic constituents estimated after incineration, by a process which it is not necessary to describe. Reducing all these results to 1000 parts, we have a table of the constitution of the blood.

This process has been followed, with unimportant modifications, by a number of distinguished chemists, who have done little more, with regard to the albumen and fibrin, than confirm the observations of Provost and Dumas. Among these may be mentioned Andral and Gavarret, Becquerel and Rodier, Sheerer, and Simon. Among these observers, perhaps, the process adopted by Becquerel and Rodier is one as generally accepted by physiologists as any, and I will therefore translate from their excellent work, entitled *Traité de Chimie Pathologique*, so much of it as refers to the estimation of the fibrin, albumen, and globules.

"*First Series of Operations.*—This is designed to furnish: First, the density of the blood and that of the serum; second, the weight of fibrin, globules, and that of the solid matter of the serum taken as a whole. These processes are founded on the same principle which served as the basis of the process devised long since by M. Dumas. We suppose that all the water contained in the blood forms part of the serum, and should be attributed to it. Still, in admitting this principle, we have not always applied it in the same manner.

"The following is our mode of operation:—

"We practise upon the person whose blood we wish to analyze, a bleeding of about 375 grammes.[1] The blood which first flows from the vein is received in a glass vessel, graduated, and capable of holding about

[1] A gramme is a little more than 15 grains.

125 cubic centimetres of this liquid. We collect it and whip it with a bundle of broom-corn. We thus obtain the fibrin, which we must wash, desiccate, and weigh.

"The blood, thus defibrinated, is then put aside to serve for other operations.

"The blood which flows from the vein, after these 125 cubic centimetres, is collected with care in a vessel of the capacity of 250 to 300 cubic centimetres and left to itself. This blood coagulates, and once the coagulation effected, we separate carefully the serum, which we put aside in a vessel; as to the clot, after having taken note of its physical characters, we may set it aside.

"Let us see now what we do; first, with the defibrinated blood; second, with the serum.

"A. The *defibrinated blood* is first weighed at a definite temperature in a glass specific-gravity bottle.[1] We compare then the weight which we obtain in this operation with the weight of the same volume of distilled water; and we thus have, by a very simple calculation which it is useless to reproduce here, the exact weight of the 125 cubic centimetres of blood which we whipped to separate the fibrin, and consequently the weight of this same fibrin contained in 1000 grammes of blood. Once this operation effected, we take a definite quantity of defibrinated blood, which we weigh, which we desiccate, which we afterwards weigh anew, and we thus have the weight of the quantity of water which it contains. Let us take, for example, in order to make ourselves better understood, arbitrary numbers which we will make use of also to deduce the weight of the globules: 100 grammes of defibrinated blood, liquid, gives 20 parts of solid material and 80 parts of water. Then 20 parts, thus dried, are calcinated to give us the inorganic matters; we will return to this.

"B. The *serum*.—After having determined the specific gravity of the serum, we take a given quantity of this liquid which we weigh, which we desiccate, which we afterwards weigh anew; the difference of these two weights gives that of the water; as, for example, 100 grammes of liquid serum having given 10 grammes of solid matter and 90 grammes of water. These operations terminated, we possess the figures necessary to deduce the weight of the globules and that of the solid matters of the serum contained in 100 grammes of defibrinated blood. Indeed, as all the water of the defibrinated blood should be attributed to the serum, we must make the following proportion:—

$$80 : x :: 90 : 10 \text{ or } x = \frac{80 \times 10}{90} = 8.8\ gr.$$

"This proportion 8.8 represents the sum of the solid matters of the serum contained in 100 grammes of defibrinated blood, and subtracting that from 20, the weight of this blood desiccated, we have 11.2 which represents the weight of the globules, and in calculating the whole to 1000, we have 1000 grammes of blood, containing:—

Water	800 grammes.
Globules	112 "
Solid matters of the serum	88 "

[1] All our specific-gravities were taken at a temperature of 12° (53.6° Fahr.) and compared exactly with distilled water at the same temperature.

"The weight of the fibrin has been given by the first operation, and should be added. Its weight is so small in proportion to 1000 grammes of blood, that we may neglect a little correction which we should have to make for the weight of the fibrin in addition to the 1000 grammes of defibrinated blood.

"Such is the first series of operations; for the second we will make use of the dried serum, and for the third,[1] of the defibrinated blood calcinated.

"*Second Series of Operations.*—These operations are designed to give the weight of the extractive matters and that of the fatty matters. The following is our mode of operation:—

"The serum, having been dried with precaution in an *étuve*, and pulverized with the greatest care, is treated repeatedly with boiling water until this water has completely freed it from everything which it can dissolve. These last are, on the one hand, extractive matters, such as osmazome, the colouring matter of serum, etc. etc., and on the other hand, the salts which are in solution in the serum and are in a free state.

"The serum, thus extracted with water, is dried again and weighed, the difference with the weight obtained by the first weighing indicates that of the matters we have mentioned and which the water has removed. The product of the second desiccation is then treated by boiling alcohol at 90°, until it is completely extracted. The insoluble residue is pure albumen, of which we may take the weight after having dried it. As to the boiling alcohol, it holds in solution all the fatty matters, which can be separated by employing the process indicated by M. F. Boudet, and of which we think it unnecessary to give a description. It gives the seroline, cholesterine, and saponifiable fats."[2]

The above quotation gives a fair representation of the mode of analysis most commonly made use of at the present day. It differs, however, very little from that indicated by Dumas. There are certain objections to this process, aside from those which have reference to the estimation of fibrin and albumen, which have long engaged more or less the attention of physiological chemists and are universally acknowledged to be well founded. It will be observed that all the water is attributed to the plasma while the globules are estimated dry. This is manifestly faulty, as the most cursory microscopic examination of the blood-globules is sufficient to convince any one that they have a consistence dependent upon the presence of a certain quantity of water; and though it may be convenient to estimate these bodies dry, such an estimate gives no idea of their real proportion. This was appreciated as long ago as 1828, by Denis, who attempted to give the proportions of moist globules by a process which had avowedly little accuracy and which he afterwards abandoned for the original process of Dumas.[3] In 1844, Figuier published an analysis of the blood which allows an estimation of the moist globules by a process which I have employed in the analyses which follow, and which seems to me to give

[1] This is to ascertain the proportion of inorganic salts.—A. F., Jr.

[2] Becquerel and Rodier, op. cit., page 21.

[3] Mémoire Sur le Sang. Par P. S. Denis (de Commercy). Paris, 1859, p. 51.

sufficiently accurate results, though Denis does not consider it superior to his own. This process was accepted by Dumas with some modifications which are described by him in the *Annales de Chimie et de Physique* for 1846, p. 452. The process of Figuier depends on the property which certain saline substances have, mixed with the blood, of retaining the globules on a filter. The modification of Dumas is intended to avoid a difficulty which sometimes occurs from alteration and liquefaction of the globules, by which some pass through the filter and are lost. It consists in passing a continuous current of air through the filtering fluid, which prevents this change. In the analyses I have made I have not found it necessary to adopt this precaution.

The following is the process described by Figuier translated from the *Annales de Chimie et de Physique*.[1] It was not used by him to determine the proportion of *moist* globules; the globules are merely separated from the blood, dried, and estimated in this condition like the other organic principles.

"The blood furnished by a venesection is whipped on its discharge from the vein according to the process of M. Dumas. The fibrin separates and adheres to the little broom-corns (*brins de balai*). The liquid is passed through a fine cloth to separate that portion of the fibrin which does not adhere to the broom. This fibrin is then washed in a current of water, then dried in a water-bath, and weighed, after having been treated, if desired, with ether to remove a little fatty matter.

"In taking the total weight of the blood which has given this quantity of fibrin, we will have the proportion of the fibrin to the other elements of blood.

"We then take 80 or 90 grammes only of the defibrinated blood which we treat with about twice its volume of a solution of sulphate of soda marking sixteen to eighteen degrees in the aërometer of Baumé, and this is thrown on a half filter weighed in advance, and previously moistened with the saline solution; with these precautions the serum filters quite rapidly with a yellowish colour.

"We understand that, to remove from the globules that remain on the filter, the solution of sulphate of soda with which they are impregnated, we cannot simply wash the filter, for that would dissolve a portion of the globules and the fluid would pass red like the blood. But a property peculiar to the globules allows us, happily, to surmount this difficulty. When they are heated to 90° (Cent.), as Berzelius has already seen, the globules are coagulated entire, and the entire mass becomes concrete without yielding to the water any of the organic matter. We have only, then, to place the filter in a capsule containing boiling water, repeating this process two or three times. The sulphate of soda is dissolved and the water takes almost nothing from the globules, for the fluid is almost colourless and does not contain any organic matter appreciable by tannin or corrosive sublimate.

[1] Sur une méthode nouvelle pour l'analyse de sang, et sur le constitution chimique des globules sanguins. Par M. L. Figuier. (*Ann. de Chim. et de Phys.*, 1844, 3me série, tome xi. p. 506.)

"To separate the albumen from the filtered serum it suffices to carry it to the point of ebullition in a capsule. The albumen coagulates; it is collected in a little net of fine cloth; it is washed and weighed, after having been dried, by the water-bath. Finally, to determine the quantity of water contained in the blood, we take twenty or twenty-five grammes which we evaporate to dryness in a water-bath. The weight of the residue indicates the properties of water and solid elements.

"The soluble salts of the serum are represented by the difference of the weight of the blood employed and the sum of the albumen, water, fibrin, and globules determined directly."

The above is a very simple and accurate process for determining the globules and organic elements of the blood, but, according to the view we have already taken, is open to the same objection as the other, as it gives the quantity of these ingredients dried, and not as they really exist.

Schmidt, of Dorpat, recognizing the necessity of a proper estimate of the *moist* globules, endeavoured to establish a certain proportion of water to be constantly attributed to them; so that by adding this quantity to the estimate of the dry globules by Provost and Dumas, and others, their results could be made use of. He endeavoured to do this by comparative microscopic measurements of the moist and dry globules, and arrived at the conclusion that the dry globules multiplied by four would give the quantity of moist globules. Though this process was adopted by Lehmann as the most accurate, it is evident that it cannot possibly be exact; especially if the proportion of water in the globules is not always the same, as is stated by Zimmermann.

Zimmermann attempted to give the proportion of water in the globules by estimating the quantity of chlorides in the blood; assuming, with Berzelius, that all the chlorides are contained in the serum and there exist none in the blood. He estimates first the proportion of the chlorides in the serum, then the quantity of chlorides in a given quantity of blood, whence he deduces the proportion of serum in the blood; then subtracting the water contained in the serum from the water contained in the entire blood, he obtains the proportion of water in the globules. As it is by no means certain that the blood-globules contain none of the chlorides, this process cannot be accepted.

Other methods, of a very complicated character, have been proposed by Vierordt, Le Canu, and Lehmann, which it is not necessary to describe, as they present no advantages over the foregoing.

The most recent process which has been proposed originated with Denis, and was published by him in 1859.[1] His manipulations to get rid of the interstitial serum of the globules are complicated and difficult, and of questionable efficacy. He arrives, by this process, at very nearly the results I

[1] Denis, op. cit.

have obtained by the process of Figuier, which, from its simplicity, is much to be preferred.

From this slight review of the processes for the analysis of the blood, especially with reference to the fibrin, albumen, and globules, it is seen that no analysis has ever been made, or even attempted, which would give the real quantities of fibrin and albumen; in all of them the dry residue, and not the substance itself, is given. In the estimation of the globules, however, this desiccating process is so evidently faulty, that efforts have been made to estimate them in their moist state, or as they really exist. As yet there is no one process, for arriving at this end, which is generally accepted by physiological chemists. From my own observations, with regard to all the constituents under consideration, it seems impossible to make an analysis which shall be perfectly accurate; but absolute accuracy is not indispensable; we can get near enough to the truth for all practical purposes, and, as the comparison of different analyses made in the same way gives them much of their value, we should fix upon that process for our estimation of the moist globules which is simplest, and which seems to give the best results. It is manifestly better to get an approximative idea of the fibrin, albumen, and globules of the blood in the condition in which they really exist, than to take the quantity of dry residue, which gives us no idea whatsoever.

Having in view, then, the condition of existence and functions of the organic constituents of the blood, it is only an estimate of these principles in a moist state that can give us any idea of their proportions.

Analytical Process.—In the process which I shall describe, I have endeavoured to simplify manipulations as far as is consistent with tolerable accuracy, deeming it important to put such investigations within the reach of every one, rather than complicate the process by precautions which are designed to avoid errors so slight that they may practically be disregarded. Dumas has shown that the composition of the blood is not precisely the same at the beginning and the end of a bleeding, and recommends, therefore, that the blood be drawn in equal quantities in four vessels, defibrinating the specimens in the second and third, and allowing those in the first and fourth to separate into clot and serum. By comparing the results of the separate analyses, a correction may be made. I have not found it necessary to use more than two specimens of two to four ounces each; and with this quantity such a precaution is not necessary.

It is very important to cover the vessels which contain the blood, and weigh them as soon as possible; for the specimens lose weight very rapidly by evaporation, as has been shown by Becquerel and Rodier,[1] which would interfere seriously with the quantitative analysis.

[1] In experiments by Becquerel and Rodier with reference to the loss of weight

The blood to be analyzed is taken from the arm, and received into two carefully weighed vessels. The quantity in each vessel may be from two to four ounces. One of the specimens is now whipped with a small bundle of broom-corn, previously moistened and weighed, so as to collect the fibrin; and after the fibrin is completely coagulated, the whole is carefully weighed, deducting the weights of the vessel and broom-corn, which gives the weight of the specimen of blood used. The other specimen is set aside to coagulate.

The first specimen is to be used for the estimation of the fibrin and globules; and the second is set aside to coagulate, and is used to estimate the albumen.

We now pass the first specimen of blood through a fine sieve to collect any fibrin that may not have become attached to the wisp, strip the fibrin from the wisp, and wash it under a stream of water. This may be done very rapidly if we cause the water to flow through a small strainer, so as to break it up into a number of little streams, and knead the fibrin in the fingers, doing this over a sieve so as to catch any particles that may become detached. In this way it may be freed from the globules in five or ten minutes. The fibrin thus washed is then freed from adherent moisture by bibulous paper, and weighed as soon as possible; and by the following simple formula we estimate the proportion per 1000 parts of blood:—

Weight of blood used : Weight of fibrin :: 1000 : Fibrin per 1000.

The next step is to estimate the globules. For this purpose a portion of the defibrinated blood, which is carefully weighed, is mixed with twice its volume of a saturated solution of sulphate of soda, and thrown upon a filter which has been carefully weighed, moistened with distilled water, and just before receiving the mixture of blood and the sulphate of soda, is moistened with the saline solution. The fluid which passes through should be about the colour of the serum; if a few globules pass at first the fluid should be poured back until it is clear. The funnel is then covered and the fluid allowed to separate, the blood-globules being retained on the filter. The filter and funnel are then plunged several times in a vessel of boiling water, by which all the sulphate of soda which remains is washed out, and the blood-globules are coagulated without changing their weight. The funnel should be covered again, and the water allowed to drip from the filter, after which it is weighed, deducting the weight of the

by evaporation, the following results were obtained. The blood was drawn into a porcelain vessel about two and a half inches in diameter:—

	Weight of blood on being drawn from the vein.	Weight of blood 2 hours after.	Weight of blood 24 hours after.
1st Exp. . .	13.242 grammes	13.070 grammes	11.510 grammes
2d Exp. . .	14.905 "	14.727 "	12.977 "
3d Exp. . .	22.453 "	22.308 "	20.337 "

—*Chimie Pathologique*, page 31.

moist filter previously obtained, which gives us the weight of the globules. We obtain the proportion of globules to 1000 parts of blood by the following formula :—

$$\text{Defibrinated blood used} : \text{Globules} :: \frac{\text{Defibrinated}}{\text{blood per 1000}} : \text{Globules per 1000.}$$

Our next step is to estimate the quantity of albumen in the serum, and thence its proportion in the blood. For this purpose we first ascertain the quantity of serum in 1000 parts of blood, which we do by subtracting the sum of the fibrin and globules per 1000 from 1000. Having done this, and waited ten or twelve hours for specimen No. 2 to separate completely into clot and serum, we take a small quantity of the serum, about half an ounce, carefully weigh it, and add suddenly twice its volume of absolute alcohol. The albumen is thus thrown down in a grumous mass, and the whole is thrown on a filter previously moisted with alcohol and weighed. The funnel is immediately covered, and the fluid separates from the albumen very rapidly. We ascertain that no fluid albumen passes through the filter by testing the fluid with nitric acid. After the filter has ceased to drip, it is weighed, and the weight of albumen ascertained by deducting the weight of the filter. The proportion of albumen to 1000 parts of blood is obtained by the following formula :—

$$\text{Serum used} : \text{Albumen} :: \text{Serum per 1000} : \text{Albumen per 1000.}$$

The above process is very simple and easy of application, and if the directions be carefully followed, will give very uniform results. I have repeatedly satisfied myself of this fact by subjecting two specimens of the same blood to the same process, which was followed by almost identical, and in some instances, identical results. For example, in an examination of human blood, two equal quantities (34.20 grammes) of defibrinated blood were analyzed for globules; one specimen gave 16.40 grammes of globules, and the other 16.43 grammes. This part of the process would seem more open to the charge of inaccuracy than any, yet the difference in the results of the two analyses is so slight that it may be disregarded.

In washing the fibrin I was at first led to use a saline solution instead of pure water; but as the mass evidently gained weight treated in this way, I afterwards employed simple water. Of two specimens of fibrin from the same blood, one, which was washed with a solution of common salt, spec. grav. 1010, gave 10.28 parts per 1000, and the other, which was washed with water, gave but 8.82 parts, a diminution of about 14 per cent.

I tried most of the methods for coagulating the albumen before fixing upon the one by absolute alcohol. The object was to get it as near as possible in its natural condition, simply changing its form from fluid to semi-solid, without adding anything which would decompose it or unite with it; and absolute alcohol seemed better than heat, nitric acid, the galvanic current, or any of the agents by which it is coagulated. It is necessary to add about

twice the volume of alcohol, and suddenly, when the fluid which separates by filtration will be found to contain not a trace of albumen. Repeated trials of different specimens of the same serum, producing generally identical results, led me to fix upon this as the best method.

It is easy to see, after a few trials, why the moist method of estimation of these organic matters has not been employed by chemists. The difficulty is to fix the standard of moisture; for the specimens, even when on the balance, lose weight by evaporation every moment. This, of course, shocks the ideas of accuracy which are necessarily ingrafted into the character of every good analytical chemist. One who is accustomed to weigh for hours, perhaps, to avoid a possible error of the thousandth of a gramme, could not consent to accept a weight which is changing every moment. Perfect desiccation is the only absolutely definite standard; and in all these organic animal analyses, the substance is weighed, and exposed to heat, over and over again, till it ceases to lose weight. Though this accuracy is indispensable in some processes in physiological chemistry, here it is not only unnecessary, but impossible. It is part of the nature of these substances to change every moment, and when they are reduced to such a condition that they will no longer change, they have lost all their characteristics as organic principles. What we want is an approximate physiological idea of their real quantity; and this is better than the most accurate estimate of their dry residue.

By the process just described, I have arrived at the following results in the few quantitative analyses of the blood for organic principles which I have been enabled to make. The variations in these constituents in different states of the human system, and in different animals, are interesting and important; but this demands time and a long series of investigations. In the few observations herein presented, it has been my object to show the advantages of the analytical process employed, so that it can be applied by others, and to give merely an analysis of the healthy human blood; and the various experiments have been made rather to be able to fix upon a definite process, than with a view to comparative results. Attention has been directed only to fibrin, albumen, and globules, for reasons which have already been fully explained. As far as the other constituents are concerned, I have not the temerity to suppose that I could improve upon the processes employed by the eminent hematologists to whom I have so often referred in this paper. The number of analyses of human blood is not large, for it is not easy to obtain healthy specimens; and with our improved notions of therapeutics, it is difficult also to obtain specimens of blood from patients. The specimens of human blood were taken from the arm. The blood of the ox was taken in the slaughter house, the vessels of the neck being divided after the animal had been knocked on the head.

Examination I. *Human Blood, Male.*—This specimen of blood is assumed to be perfectly normal. The subject was 27 years of age, male,

perfectly healthy, and had never suffered from disease. Weight, 170 pounds. The blood was taken from the arm at 1 P. M. The last meal had been taken at 8 A. M.

The following is the result of analysis of the blood:—

Fibrin	8.82	parts per 1000.
Albumen	329.82	" "
Globules	495.59	" "

Examination II. *Human Blood, Male.*—This specimen was taken from a man, 37 years of age, calker by trade, weight 200 pounds, but rather corpulent than muscular. He had slight constitutional syphilis, and had been taking the iodide of potassium, gr. x three times a day, for about three weeks. He was bled from the radial vein about two hours after dinner.

The following is the result of analysis of the blood:—

Fibrin	7.44	parts per 1000.
Albumen	277.55	" "
Globules	480.44	" "

Examination III. *Human Blood, Female.*—This specimen was taken from a female, 27 years of age, weight 160 pounds, dark complexion, and perfectly healthy, with the exception of a slight plethoric tendency, as indicated by occasional epistaxis which had troubled her for a few days. She menstruated regularly, the last time about two weeks before. She took lunch about 11 A. M., and was bled at 2 P. M. The blood coagulated rapidly, and in twelve hours the clot presented the "buffed and cupped" appearance in a marked degree. A portion of the defibrinated blood which was not used in the analysis presented a remarkable example of gravitation of the globules and separation from the serum. It stood in a graduated glass, and the upper half, by measurement, consisted of pure serum. The whole fluid was f℥xii℈, and the globules marked f℥vi½.[1] Two days after the venesection the woman still enjoyed perfect health.

The following is the result of analysis of the blood:—

Fibrin	16.81	parts per 1000.
Albumen	311.18	" "
Globules	484.51	" "

Examination IV. *Human Blood, Female.*—This specimen was taken from a woman, 28 years of age, of somewhat anæmic aspect. She had been taking ℥j of sulphate of magnesia every second day for two weeks.

[1] This tendency of the globules to gravitate in defibrinated blood was noticed by Poiseuille, and is mentioned by Bernard, who advances the view that one of the important functions of fibrin is to keep the globules in uniform suspension. (Bernard, *Liquides de l'Organisme*, tome i. p. 465.) The phenomenon is by no means invariable. I have seen specimens of blood in which there was no gravitation of the globules. Such a complete separation as was presented in this specimen of blood is very remarkable.

The medicine usually operated three or four times. She was bled at 2 P. M., having eaten nothing since 8 A. M.

The following is the result of analysis of the blood:—

Fibrin	11.34	parts per 1000.
Albumen	219.47	" "
Globules	382.95	" "

Examination V. *Blood of the Ox.*—This specimen was taken from a small ox, the throat being cut after he had been knocked in the head.

The following is the result of the analysis:—

Fibrin	14.52	parts per 1000.
Albumen	195.24	" "
Globules	623.36	" "

Examination VI. *Blood of the Ox.*—The animal from which this specimen was taken was rather larger and more vigorous than the one which furnished the blood in Exam. V.

The following is the result of the analysis:—

Fibrin	16.27	parts per 1000.
Albumen	200.85	" "
Globules	568.61	" "

Of the four observations on the human subject, but one, Exam. I., can be taken as a fair example of normal blood. This analysis shows that the moist globules constitute about one-half of the entire mass of blood; an estimate which does not differ very considerably from the results obtained by others who have endeavoured to solve this question. Denis gives the proportion of globules in a person "30 years of age, strong constitution, sanguine temperament," 489.52 parts per 1000.[1] Schmidt estimates the moist globules at 513 per 1000 for the male and 396 for the female.[2] Lehmann estimates them at 496 per 1000.[3]

The albumen constitutes by far the greater part of the other organic matter, and forms nearly one-third of the entire weight of blood. As this is undoubtedly the element which nourishes the organic parts of the tissues, which form the greater part of the body, we are not surprised at its preponderance. The fibrin we see, even by this mode of analysis, exists in small quantity; sufficient, however, to firmly coagulate the whole mass of blood. One is surprised in washing a large clot to see how little fibrin is necessary to thus entangle all the globules. The salts were found to exist in the fibrin, albumen, and globules, which were all tested for chlorides, carbonates, phosphates, and sulphates.

Taking Becquerel and Rodier as authority for the proportion of fatty,

[1] Denis, Mémoire sur le Sang., Paris, 1859, p. 427.

[2] Milne Edwards, Leçons de Physiologie, &c., tom. i. p. 237.

[3] Lehmann, Physiological Chemistry, American edition, vol. i. p. 548.

inorganic, and extractive matter, the following table represents the composition of the blood in a healthy adult male.

COMPOSITION OF THE BLOOD.[1]

Globules		495.59
Plasma.	Water	155.42
	Fibrin	8.82
	Albumen	329.82
	Fats, inorganic salts, and extractives (B. & R.)	10.35
		1,000.00

We have not yet sufficient data to arrive at any definite conclusions with regard to the variations of the organic constituents of the blood, as regards sex, conditions of the system, and in different animals, which, indeed, would be beyond the scope of this paper; but the few facts we have collected go to confirm some of the observations which have already been made upon these points. It has been often observed that the blood of the ox is much richer in fibrin than that of the human subject, the former containing from 5 to 6 parts per 1000 dry, while the latter contains but from 2 to 3. This difference is shown in the preceding analysis, where the blood of the ox is found to contain 14.52 to 16.27 parts of moist fibrin, human blood containing but 8.82 parts. The analysis also shows a greater quantity of fibrin in the two specimens of blood of the female than in the blood of the male. In the observations of others the quantity has not been found to vary much in the sexes. In this instance neither of the specimens from the female could be taken as perfectly normal; as in Examination III. the subject was plethoric, and in Examination IV. she had been taking sulphate of magnesia, and was somewhat anæmic.

The albumen was found to vary considerably in the specimens of human blood, being more abundant in the blood of the male in Examination I. than the female in Examination III. and IV., but less in the blood of the male in Examination II. than in the female in Examination III. There are not here sufficient data to form any conclusion with regard to the variations of albumen in the sexes. In the blood of the ox, the albumen was much less than in human blood.

The quantity of globules was found to be greater in the male than in the female. This has been noticed by all observers who have directed their

[1] In order to ascertain whether this specimen of blood contained what would be considered the normal quantity of organic constituents estimated by the old method, these were evaporated to dryness and weighed carefully, with the following result, which it will be seen corresponds with that generally obtained:—

Fibrin	2.50	parts per 1000.
Albumen	71.53	" "
Globules	125.00	" "

The proportion of albumen to the serum was 82.07.

attention to this subject, and is, perhaps, one of the most characteristic differences between the blood of the male and of the female. One of the females was slightly plethoric, which caused the globules to mount up nearly to the standard of the healthy male. This condition of plethora, according to Andral, is dependent almost entirely upon an increase in the globules. The difference in this respect between the blood of the female who was slightly plethoric, and the other, who was somewhat anæmic, is very marked; in the former the globules are 484.51 and in the latter 382.95. The blood of the ox was found to be very rich in globules.

In conclusion, I beg leave to state that I have not attempted in this paper to settle the normal constitution of the blood, much less to follow out the variations to which it is subject. This would require a largely extended series of observation. But, considering a proper idea of the condition of existence of the organic ingredients of immense importance to the physiologist and physician, I have endeavoured to study this fluid from a physiological point of view; and, with the ideas I have been led to entertain on this subject, it seemed that a new mode of analysis was indispensable, which would give us the real proportions of these principles. My object has been merely to settle upon some rational and simple process, leaving its extended applications to be made in the future. The process I have described seems to me sufficiently accurate for all practical purposes; and is so easy of application, that I cannot but indulge the hope that many may be led to cultivate this interesting and fruitful field of inquiry.

ART. V.—*Conservative Medicine as Applied to Hygiene.* By AUSTIN FLINT, M. D., Professor of the Principles and Practice of Medicine in the Bellevue Hospital Medical College, and in the Long Island College Hospital.

As the phrase *Conservative Medicine* may be misconstrued, a brief explanation is to be premised. The term Conservatism may be used to express a principle which leads the practitioner, in dealing with diseases, to preserve, develop, and support the vital powers. The unfolding of this principle more and more during the last quarter of a century, has been a result of the progressive increase of the knowledge of the organism in health and disease, together with the accumulating fruits of clinical experience; it is the characteristic of the therapeutics of the present time, as represented by the views of the ablest writers and practitioners, and it is claimed that it should be considered as the governing principle in medical practice. For a fuller exposition, the reader is referred to the previous articles on the subject.[1]

[1] *Vide* Am. Journ. of Med. Sciences, No. for January, 1863.

The subject of conservative medicine in the articles just referred to, has been considered chiefly as regards its therapeutical relations. The purpose of this article is to consider the subject in its relations to *Hygiene*. Here, as heretofore, the largeness of the subject is such that the writer can only aim, within the limits of a single article, to present a few desultory thoughts which may be suggestive, in the minds of his readers, of trains of reflection leading to important practical conclusions.

Hygiene enters alike into the prevention and management of diseases. The name suggests more especially measures concerned in the preservation of health; but, in therapeutics, all measures, not medicinal, may be distinguished as hygienic. I shall use the term with this breadth of application. And it will be a natural division of the subject to direct attention, *first*, to hygiene in health, and, *second*, to hygiene in disease. I will adopt this arrangement.

Conservatism, as applied to hygiene in health.—There is no need to argue for the validity of the principle of conservatism as applied to the preservation of health. Hygiene, in this application, can, of course, have no object which does not assume to be conservative. To weaken the powers of life, or impair the constitutional strength, is never the design of measures to prevent disease. The violations of the principle which fall within this division of the subject proceed either from ignorance, or false notions as regards the effects of means supposed to be conservative. Violations of the principle are less frequent and marked now than formerly; the progress of conservative medicine is shown in its prophylactic, as well as its therapeutical relations; still, examples of not only past, but present non-conservative errors are not wanting.

It is not many years since the notion was prevalent, both within and without the profession, that there is such a condition as an overplus of health. And it was the custom to resort to potent measures to reduce the exuberance of health within safe limits. Bleeding and purging were employed for this end. There are persons now living who were accustomed, in their young days, to get bled from time to time purely as a sanitary measure. Nothing was more common, a quarter of a century ago, than for healthy persons to apply at the offices of physicians for a venesection, which was performed, as a matter of course, on the judgment of the applicants. Such occurrences are very rare at the present time. Purgation, being practicable without the aid of the doctor, was almost universally employed as a health-preserving duty. Cathartics were regarded as cleansing agents, and not less important for the alimentary canal, than soap for the surface of the body. An occasional internal "scouring" was supposed to be even of greater importance than a thorough external scrubbing, for while the latter was enforced chiefly on the score of cleanliness, the former had the additional recommendation of being thought to be essential to the welfare of the system. There are many now in middle life, with whose

reminiscences of childhood are associated periodical doses of sulphur and cremor tartar mixed with molasses, given regularly for a series of days, before breakfast, or at bedtime, especially at every recurrence of the vernal season. This was the cleansing mixture for healthy persons of tender age. After this period, the so-called cooling purgatives, such as the Glauber and Epsom salts, had preference. A person with an excess of health was considered to be on the threshold of disease, and the latter was supposed to be warded off by the timely employment of the lowering, cleansing, and cooling measures just referred to. The popular use of purgatives or prophylactic agents, is still sufficiently common.

Gestation is a physiological, not a pathological, state; and, since it is by no means a modern discovery that all the needful supplies for the development and growth of the fœtus are contained in the maternal blood, a common-sense view of the matter, it would seem, should have led to the conclusion heretofore, as now, that pregnant women cannot well afford to lose blood; yet, a few years ago, pregnancy was supposed, as a matter of course, to call for repeated blood-lettings. The physician who declined to bleed a healthy person desirous of losing blood simply on the score of pregnancy, had often a task in trying to remove the disappointment which his refusal occasioned. Venesection, under these circumstances, was deemed an important sanitary measure. How such an absurd notion arose, I will not stop fully to explain. Briefly, it was a result of theoretical views respecting inflammation, views which led to the conclusion that the great source of danger, as regards the development of disease, was a redundancy of the vital fluid. How different the practical views of the present time, based on the belief that paucity and impoverishment of the blood are conditions often giving rise to, and standing in the way of recovery from, a variety of diseases!

As another example of the violation of conservatism, may be cited the custom with many surgeons, formerly, to prepare the system for important operations by lowering the powers of life. For this end, a course of purgatives, a system of reduced diet, and sometimes a venesection, were deemed important. This custom does not seem to be entirely exploded at the present time. In like manner, if there were good grounds to expect the speedy occurrence of any disease, as, after exposure to contagious fevers, during the period of incubation, a similar plan of impairing health, by way of preparation for the disease, was considered to be a prudential measure.

Now it may be laid down as a rule of prophylaxis, that, other things being equal, disease is less liable to occur in proportion as the health is perfect and the vital powers high in the scale of strength. This rule may not invariably hold good. Some of the special causes of disease, among those styled zymotic, appear sometimes to luxuriate in vigorous organisms; but if there are exceptions, they do not subvert the rule. If this be true,

it is a correlative truth that everything which impairs health or depresses the vital powers, favours the occurrence of disease. Observation and common sense warrant the adoption of the latter truth as a maxim of conservative medicine. Akin to the foregoing rule is another, viz., the system is prepared to endure and recover from disease in proportion to the previous completeness of health and the degree of constitutional vigour. Without having the statistical data to demonstrate this rule, and without denying the possibility of exceptions, observation and common sense warrant its adoption as a maxim of conservative medicine. Let us, then, inquire whether among the existing notions or customs having reference to hygiene in health, there be not some which are inconsistent with the foregoing conservative maxims. I do not mean to inquire concerning those palpable violations of the laws of health, which every reflecting person recognizes as such, and which are common enough. My proposed inquiry relates to false views respecting the means of preserving health or warding off disease; in other words, instances in which persons suppose they are doing right when, in fact, they are doing wrong. It will not be difficult to find examples of this kind.

The wear and tear incident to untiring activity in the pursuits of life first suggests itself. In this country the evils springing from false notions and customs, relating to the exercise of the mental and physical faculties, are enormous. A young man enters upon active life, with injunctions to push his industry to the utmost limit of his capacity of endurance; he is incited to constant exertion by the examples of others; he is stimulated by his ambitious aspirations or a conscientious desire not to be wanting in the discharge of his duties; his position and responsibilities, in the existing state of society, may seem to render excessive and unremitted assiduity imperative. He may, or may not, violate the laws of health in other respects. If he be regular in his habits, temperate and moral, he is encouraged on every side by approving friends; he is held up as a model for imitation; he looks upon himself with self-complacency; and yet, he is advancing steadily onward, perhaps, to the accomplishment of the great objects in life before him, but with greater certainty to a condition of impaired health, with the mind weakened or disordered, and a proclivity to any disease to which there may be a predisposition. All physicians, especially those who practise in cities and large towns, well know that there is a class of patients who suffer from the want of health, without having any disease which has a place in the nosology. The morbid state in these cases has been gradually induced, and many suffer without appreciating the fact that their state is morbid, and, therefore, without making application for medical aid. They feel a deficiency of their accustomed energy and buoyancy, their interest in persons and things flags, their appetite fails, they lose strength, and they are depressed, without any apparent reason, or, by causes which, in a condition of health, would disturb the

mind very little. These are the early effects of wear and tear, due to overtasking, not the physical powers alone, but, conjunctively, the mental faculties. Of the cases of chronic diseases, such as tuberculosis, Bright's disease, diabetes, etc., how large is the proportion in which the previous history shows the existence of wear and tear for a greater or less period prior to the development of the affection? This would be an interesting point for statistical research, but we need not wait for the results of statistics to know that the proportion is large. And, of the cases of acute diseases developed in persons suffering from wear and tear, how much of the fatality is due to the diminished power of resistance incident to the antecedent morbid state! How many would probably escape the development of acute disease were it not for this morbid state!

These considerations, while they are of vast importance, should not militate against a proper degree of attention to the objects in life. They do not show that either physical or mental activity is unfavourable to health. The reverse of this is undoubtedly true. As regards the mind, it is not the intensity of the exercise of the faculties which involves wear and tear. It is the long-continued, unrelaxed efforts, accompanied by unceasing anxiety and strain, which tell upon the system. The physician, oppressed by the weight of his professional cares, is well aware that it is not the demand for the operations of the intellect which bears heavily upon him, so much as the pressure of the sense of responsibility inseparable from his duties. It is not the frequency or force with which the bow is bent, but the constant tension, which destroys its elasticity and renders it worthless. Unremitted exercise of the mental and physical powers, although they are not overtaxed, cannot be indefinitely borne; sooner or later the system will break down. Here is a truth difficult to appreciate in its personal application; but every one recognizes it in its application to the physical endurance of inferior animals. A horse, never overworked, and in all respects well cared for, after a time must be turned out to grass. The prudent owner sees this clearly enough, and acts accordingly, while he fails to see that what is true of his horse is not less true of himself. Many persons pursue a course with respect to themselves which they could not pursue, without remorse, toward a beast of burden. It appears to be a part of the egotism inherent in some persons to think that they are so constituted as to bear an unlimited duration of steady work. Next to this is the folly of supposing that the powers of the system, when they give way, may be restored by medication. And when, at length, they find that they are not exempt from the laws pertaining to all animal, as well as human bodies, they perhaps discover, too late, that the influence of habit has rendered continuance of labour essential to happiness. Fortunate are they who, without sacrificing aught that belongs to a proper degree of assiduity in pursuing the objects of life, have taken care to preserve the capacity for healthful recreation!

It is a curious notion, which physicians sometimes inadvertently sanction, that mental and physical exertions are compensatory as regards each other. The man who is overworking the brain, seeks to make amends by fatiguing the muscles. It has occurred to me repeatedly to meet with persons who were devoting too large a number of hours daily to labour of the mind, and who imagined that this may be done with impunity provided a certain amount of muscular exercise be added. A lawyer, for example, who habitually devoted ten or twelve hours a day to intense intellectual occupation, became sensible that he was tasking unduly his mental powers, and, in order to fortify his health, moved out of town, and managed to ride on horseback from ten to twenty miles each day. Under the combined effects of the exercise of mind and body, as might be expected, he was losing ground rapidly. It is clear that exhausting mental labours will be longest borne in proportion as the time not thus occupied is devoted to physical, as well as mental, repose; and, on the other hand, that too much physical labour will be less hurtful in proportion as it is not conjoined with activity of mind.

Violations of conservatism, hardly less flagrant, in the hygiene of health, relate to diet. Both the profession and public have been sufficiently alive to the subject of gluttony. The evils of over-feeding, as regards the production of disease, have undoubtedly been exaggerated. The injurious effects of gormandizing habits are mental and moral, rather than physical. So far as health and prophylaxis are concerned, false notions in an opposite direction have been productive of more harm. A quarter of a century ago, dietetic abstemiousness was considered to be the alpha and omega of hygiene. The world was eating too much; hence, the ills that flesh is heir to. So believed, not only physicians, but the non-medical health philosophers. The great conditions of health were supposed by many to be the minimum quantity of food with which life could be supported, as little variety in the articles of diet as possible, coarseness in quality, and rejection of most of the accessory aliments. Some advised, as a security against errors of quantity, to regulate each meal by weight.

Vegetarianism had not a few apostles and disciples. We have heard a transcendental reformer contend that in assimilating meat the natural characteristics of the animals were necessarily appropriated; that is, pork communicated to man the attributes of swine, and so of beef, mutton, veal, etc. All the refinements of the art of cooking were deprecated as tempting to over-indulgence.

The sense of taste was deemed a fallacious guide in the selection of articles of diet, and the appetite was so unsafe as a criterion of sufficiency, that the injunction was always to rise from the table hungry.

It was considered a wise course to watch carefully the progress of digestion, so as to ascertain after every meal whether any imprudence had been committed. The subject of dietetics was discussed, not only in medi-

cal writings and in intercourse with physicians, but it entered largely into popular literature; it not only pervaded table-talk, but ranked next to the weather in common conversation; public lecturers made no small account of it, and it was not overlooked in the pulpit. In short, the zeal in behalf of abstemiousness in diet amounted to fanaticism. And dyspepsia was the most common of all ailments among the intelligent and cultivated classes, while it was rare among those who, without thinking of dietetics or digestion, satisfied the appetite with the food placed before them. There is reason to believe that the fanatical notions just referred to, not only contributed to the prevalence of dyspeptic disorders, but favoured, in no small degree, the development of other and graver affections, by impairing health and lowering the vital powers.

These notions are by no means yet obsolete either within or without the profession. There are many now who fancy they promote the welfare of body and mind by habits of diet which are incompatible with the highest degree of mental and physical vigour. There are physicians who sanction such violations of the hygienics of health. It is still considered by not a few to be gross and unrefined to eat heartily. Especially with the other sex, it is deemed a lady-like accomplishment to have a delicate appetite, and abstain from the more substantial articles of food. There are fashionable boarding-schools where, as a part of the educational discipline, girls are placed under dietetic restrictions which, in a measure, explain the imperfect development, the anæmia and feebleness of constitution of those who are preparing to become wives and mothers. It is not yet sufficiently appreciated by all, that the *mens sana in corpore sano* is best secured by nutritious supplies abundant and varied; that the healthiest, ablest, and best men and women have been good feeders; that an excess of ingesta over the absolute wants of the economy is not necessarily an evil, there being provisions made for the disposition of an overplus, but none against a deficiency of aliment; that generous living, constituting an important part of the management of certain diseases, *e. g.*, pulmonary tuberculosis, must be also important in preventing their development; that hunger, appetite, and taste were designed to govern dietetics, and are adequate to their office; and that personal experience derived from watching the progress of digestion, is extremely fallacious. There is still, therefore, scope for the progress of conservatism in this direction, in order to meet the requirements of existing knowledge and of common sense.

With these few remarks on conservatism as applied to hygiene in health, I pass to the second division of the subject.

Conservatism as applied to hygiene in disease.—The importance of the hygienic management of diseases has not been, and is not, adequately estimated, for two reasons: *First*, because hygiene in its relations to health has been imperfectly understood and is not sufficiently appreciated; and, *Second*, too great reliance has been placed on medicinal measures of treat-

ment. It is only within late years that the profession has begun to be awake to the vast importance of the study of the laws of health. Sanitary science is yet in its infancy, and claims far more interest and attention than it now receives. The main dependence, hitherto, in the management of diseases, has been on the curative influence of remedies. That many diseases, under favourable hygienic circumstances, intrinsically tend to recovery, is a fact but recently known and still too little considered. The mind of the physician is too often engrossed with the inquiry, "What drugs shall I give to effect a cure?" and, hence, he frequently loses sight of another inquiry, often of far greater consequence, viz., "What hygienic regulations will contribute to the recovery of the patient?"

This division of my subject has diverse relations. In one aspect it relates to the various hygienic circumstances embraced under the heads of diet and regimen; the latter comprehending influences affecting not only the physical but the mental and moral being. In another point of view, it relates to different diseases, the different stages of disease, and the numerous circumstances which are incidental to disease. I cannot undertake to treat of this more than the former division of the subject with any approach to completeness, or in a systematic manner. I shall only offer a few desultory thoughts, and I will consider first the topic which was last considered in the former division, viz., *diet*.

A striking improvement in the practice of medicine, of late years, relates to diet. Physicians have learned to appreciate, more than formerly, the value of supporting treatment in fevers and other acute diseases, and to regard alimentation as an essential part of this treatment. They have also learned that it is a great object in various disorders and chronic affections to build up the powers of the system, and that this is to be done by conjoining with other measures nutritious food. Has improvement in this direction reached its limit? Is the extent to which alimentation should enter into the management of diseases, fully appreciated? Let us see if there be not ground for answering these questions in the negative.

Limiting attention to acute diseases, it is now generally understood that they do not stand in the way of dying from starvation. Graves uttered a literal fact when he said that patients with continued fever, treated without nourishment, may be starved to death. And this fact is equally applicable to other acute diseases. That a fatal result may take place, and not infrequently has taken place, not from an existing acute disease *per se*, but from inanition, will not be denied. Now it is only an extension of this fact to say that more or less of the morbid phenomena pertaining to the progress of acute diseases are due to a suspension or impairment of the processes involved in nutrition. If patients affected with acute diseases may die from inanition, the latter must play an important part in the production of the phenomena manifested in connection with the diseases; and this must be true of cases which end in recovery as

well as of those which terminate fatally. Deficiency of assimilation originates the symptomatic phenomena, in acute diseases, to a greater or less extent, and here is a source of danger in a greater or less degree. In other words, the symptoms which represent the condition of a patient affected with an acute disease, spring, in part, directly from the disease, and partly from the want of appropriation of fresh supplies for nutrition. Innutrition, in a pathogenetic point of view, has not been sufficiently considered. There is reason to believe that it forms a constant, and often a very important element of all acute diseases; and the practical bearing of this fact is of great importance.

It is fair to assume that the effects produced in a healthy person by withholding food, may also result from the want of nourishment in disease. If starvation be not less fatal in the latter case than in the former, the morbid phenomena, it may be reasonably supposed, are essentially the same in both cases. In order, therefore, to judge of the extent to which the symptoms of disease are attributable to innutrition, the clinical study of starvation in health is important. Experimental observations in inferior animals are not altogether satisfactory in consequence of the difficulty of appreciating certain symptoms. Nor are the instances of human beings starved from necessity, as in shipwreck, suited to the purpose, because the effects of the want of food are mixed with the moral influences incident to their situation, and, moreover, in such instances, generally, there is a deprivation of water as well as food. Experiments voluntarily made are to be preferred; and of these the best to which I am able to refer are those made by Hammond, to establish the relative nutritive value of albumen, starch, and gum.[1] Subjecting himself to the trial of restricting his diet to these alimentary principles singly, Hammond found that they were incapable of supplying the wants of the system, and that the two latter were absolutely innutritious. During each experiment certain phenomena were produced. Now, these phenomena, for the most part, certainly were not produced by the alimentary principle taken, but resulted from the absence of other alimentary principles, or in other words, from innutrition. These experiments, therefore, may be taken as illustrative of the morbid effects of starvation, effects occurring in disease as well as in health. In this point of view they are not only interesting, but of great value. Referring the reader to the essay for fuller details, I will simply mention the symptoms entering into the concise descriptions by the experimenter.

1. Under a diet consisting of pure albumen for ten days: Febrile movements, heat and dryness of skin, headache, loss of appetite, nausea, abdominal pains, progressively increasing debility, serous diarrhœa, want of sleep.

[1] *Vide* Physiological Memoirs, by Wm. A. Hammond, M. D., Surgeon-General U. S. Army, etc., 1863.

2. Under a diet of pure starch for ten days: Debility, disturbed sleep, sense of oppression of chest, palpitation, headache, slight scratches of the skin showing tendency to inflammation and suppuration, febrile movement, abdominal pains.

3. Under a diet of gum, which he was able to continue only for four days: Abdominal pains, disturbed sleep, headache, febrile movement, diarrhœa.[1]

Can it be doubted that these symptoms occur under similar conditions as regards diet, in the course of disease? And, if so, how often are these symptoms, presenting themselves in the course of disease, referable, measurably or entirely, to innutrition? I cannot dwell upon these inquiries. I must leave them, reiterating the belief that, while under erroneous views, physicians have been accustomed to regard the ingestion of nutritious food during the course of acute diseases as fraught with evil results, more or less of the morbid phenomena supposed to belong directly and exclusively to the existing disease, proceed from defective assimilation.

The practical conclusion based on the statement just made is obvious. It is an object in the management of acute diseases not to withhold nutriment, but to promote the assimilation of nutritious supplies. In many diseases this is *the* great object in the management, taking precedence of any known curative remedies. The object always exists, but the extent to which it can be accomplished varies according to the nature and seat of the disease, together with a host of incidental circumstances. The object is the basis of a principle which may be laid down as applicable to the treatment of all acute diseases, viz., alimentation is important to the fullest practicable extent. It is always desirable for a patient affected with any acute disease to take as much food, embracing a proper variety of alimentary principles, as will be appropriated. Inconvenience and evil results may doubtless follow the ingestion of aliment beyond the powers of digestion and assimilation; but the risk of injury from this source, with the exercise of a fair amount of prudence, is less than the liability of harm if, from an excess of caution, the patient suffer from starvation. The minds of physicians have been too exclusively directed to the harm which may possibly be done by overfeeding in acute diseases, and they have overlooked the greater harm of failing to furnish supplies which may be digested and assimilated notwithstanding the existence of disease.

A wide field is opened up by the practical application of this principle. It involves the encouragement of a desire for food instead of the dis-

[1] For a full account of the effects of starvation on the different organs and functions, and for references to the literature of this subject, the reader is referred to the *Cours de Physiologie*, par P. Bérard, tome premier, pages 517 *et seq.* The following quotation, by this author, from Chossat, embraces a fact which has been to a great extent overlooked: "*L'inanition est une cause de mort qui marche de front et en silence avec toute maladie dans laquelle l'alimentation n'est pas à l'état normal.*"

couragement caused by needless apprehensions. The desire for food may often be developed by judicious contrivances; the appetite may be fostered, on the one hand, or, on the other hand, destroyed by circumstances connected with the selection, preparation, and administration of articles of diet. Giving medicines too frequently, and the use of nauseous or nauseating remedies, may do harm by compromising the desire for food and appetite, which their remedial effects will not compensate for. The mental condition may conflict with a disposition to take food, when, if taken, it will be digested and assimilated; this is true of the continued fevers, and other diseases accompanied by a typhoid state. In such cases food is to be given without regard to the desire or appetite; the condition of the digestive organs, and the results of experience from day to day, are of course to be considered. These are some of the numerous circumstances affecting alimentation as a measure of management in acute diseases. I must content myself with this allusion to them. But in passing from this topic, a word or two with regard to the diet of hospitals. This is generally determined by the supposed wants of the system, without much reference to the choice or wishes of the patient. How much good might be done by selecting, preparing, and serving food to hospital patients with a view, not alone to the requisite amount and variety of nutritive material, but to develop, encourage, and satisfy desire and appetite! I have often thought if I had unlimited control of the culinary department of a hospital, I would willingly submit to a proportionate curtailment of the articles pertaining to the dispensary.

I cannot find space even to touch upon the various practical points pertaining to the kinds of food suited to the diverse circumstances incident to different diseases; and I will only add, lest some of my readers may imagine what I have written on the dietetic management of acute diseases to be purely speculative, that the views now presented are based not only on reasoning believed to be sound, but on considerable experience. This experience would have been larger were it not that traditional ideas fixed in the public mind, as well as still prevailing in the profession, render it difficult often to carry out an efficient plan of alimentation in private practice; and in hospitals this part of the treatment is limited by circumstances which the physician cannot control. Prejudices, professional and popular, against air and water in the management of acute diseases, prevailed until within a recent period, and are by no means now obsolete. The antipathy to feeding patients will in time appear as absurd as to deny drink and disregard ventilation.

The foregoing remarks have had reference to diet in acute diseases. The importance of ample alimentation in chronic affections is better appreciated, but there is room here for further improvement. I shall content myself here with a maxim of conservative medicine, quoted from my first essay on this subject: "Under all circumstances, a chronic affection is less likely to

be prolonged, serious lesions of structure are less likely to take place, and a fatal termination is postponed in proportion as the vital powers are preserved." I need not stop to argue that the vital powers are to be preserved by a nutritious diet conjoined with other hygienic measures.

I have just now alluded to *air* as an element of hygiene in disease. Of the various hygienic conditions, perhaps, to none has attention been more directed, of late years, than a sufficiency of breathing space and adequate ventilation. There is room, however, for the inquiry whether improvement here has reached its limit. Granting the largest estimate of cubic feet, and the best contrivances for the renewal of the air of the ward or sick-room, there is reason to think that additional influences pertaining to the atmosphere may be brought to bear with advantage on the management of diseases. During the present civil war in this country it has been repeatedly observed that the wounded have done better in the open air, exposed to deprivations and vicissitudes of weather, than after having been received into houses or hospitals, containing every provision for comfort. Surgeons have found that the most effectual mode of arresting hospital gangrene is to transfer patients at once to tents, and the rapidity of improvement in the latter situation is remarkable. Now, the question arises, may not outdoor exposure, or what is equivalent thereto, be useful in many acute diseases? Its usefulness in chronic affections is acknowledged. This question is worthy of consideration with a view to experimental observation. It would not be surprising if patients affected with fevers and acute inflammations were found to improve in a notable degree under the freest possible exposure to air. As to the choice between such exposure and insufficiency of space and ventilation, there is, of course, no question. There are facts enough bearing on this point. But the question is whether such exposure may not be advantageously added to the observance of the usual sanitary requirements respecting air. Free and daily exposure is important as a means of preserving the vigour of the body in health; may it not be equally important as a means of keeping up the vital powers in disease? Every one accustomed to spend much time in hospital wards, must be aware of the sense of debility felt after remaining there for even two or three hours. How different the feeling after having been in the open air for the same period! How would the strength and energy of mind and body flag, if an active, healthy man were confined for successive days and weeks to an apartment, with the air sufficiently renewed to preserve its purity, but kept steadily at a uniform warm temperature! How refreshing would be cool breezes and alternations of heat and cold after such a confinement! Do not these facts apply to the body and mind in disease as well as in health? As a general rule, the hygienic circumstances required by conservatism in health, are not less important in disease; and it is at least highly probable that, as respects the depressing effects of confinement in heated rooms on

the one hand, and the invigorating effects of free exposure to air on the other hand, sanitary laws are applicable alike to disease and health.

As bearing indirectly on this topic, I may refer to instances of persons passing safely through fevers and acute inflammations, in situations in which they are necessarily exposed to atmospherical vicissitudes. For example, I have reported a case of pneumonia affecting one entire lung, the patient living entirely alone in a shanty, in the winter season, in Louisiana; the shanty in a swamp, the floor of earth covered with water; his subsistence consisting of bread and water with a bottle of whiskey, and the evacuations passed in bed. The patient was discovered and removed from this situation to the Charity Hospital of New Orleans already convalescing, and he rapidly recovered. I have known a patient affected with pneumonia escape from the ward in a state of delirium during the night in the winter season, wearing only a cotton shirt, and walk a distance of two miles to a house where he had formerly lived. He was brought back to the hospital the next day, free from delirium, and he convalesced rapidly, having received no detriment from this great amount of exposure and exertion. Examples analogous to these occasionally fall under the observation of all practitioners. They show, at least, that prevailing apprehensions of danger from exposure to atmospheric influences, during the progress of acute diseases, are much exaggerated. This remark will apply to early gestation in convalescence from acute diseases. It was formerly supposed that most acute diseases left behind them a liability to relapse, or a condition favourable for the development of other affections; and, therefore, that great care must be taken to avoid all exertion, and especially the morbific agency imputed to cold. A better knowledge of the natural history of diseases has taught us that, as a rule, there is little or no tendency to relapse, and that the sequels of certain diseases proceed from intrinsic tendencies. Of the hygienic circumstances favouring rapid and complete restoration to health, getting up as soon as the strength will permit, and gentle exercise in the open air, are among the most efficient. I could cite illustrations of this fact in abundance. As I am writing, a striking instance comes to my mind of a fellow-practitioner who had kept the bed for a long time with chronic pleurisy, accompanied with great debility and emaciation, and, finally, bed-sores were added to his sufferings. At this juncture he was taken out of bed, placed in a carriage, and driven a short distance. The effect on body and mind was such that the experiment was repeated. He continued to ride out daily, and rapidly recovered. This was many years ago; he is now in good health and in active practice. This is a striking instance among many exemplifying the hygienic importance of air and exercise in determining convalescence and promoting recovery.

Are the requirements of conservatism fully met by a due appreciation of all that pertains to mental hygiene in disease? This question will lead to

a few remarks which will conclude my brief consideration of conservatism as applied to hygiene in disease. Physicians are not unmindful of the reciprocal influences of mind and body. It would be trite to assert their existence and importance. They are patent to every medical observer. But it is perhaps true that mental conditions are more largely concerned in either favouring or antagonizing disease than is generally supposed; and, hence, that the therapeutic value of hygienic influences acting primarily on the mind, are not sufficiently appreciated.

It is obvious that the capacity of resisting and recovering from disease varies in different persons. The same disease, having apparently the same intensity, will destroy some and not others. And there is a wide difference as regards the duration of life with a similar amount of incurable lesions. Take, for example, pulmonary tuberculosis, how great the diversity in the extent of destruction of the lungs in cases in which this disease alone has produced death! Now this intrinsic power of overcoming disease, and of living on with irremediable affections which will sooner or later prove fatal, is not altogether vital but in part mental. If the faculties of the mind be not impaired or obscured by disease, the patient is rarely indifferent to its progress or the result; it is accompanied by more or less emotional activity. Much, often very much, depends on the character of the predominant emotions. Hope, confidence in the physician and the means of cure, reliance on the wisdom of Divine Providence, are sentiments which sustain the vital powers and are conservative. On the other hand, discouragement, apprehensions, dissatisfaction, impatience, depress the vital powers and are non-conservative. The character of the predominant emotions will, of course, depend in a great measure on mental constitution, education, habits of thought and feeling, etc., with reference to which there is nothing like uniformity in different persons; but judicious management on the part of the physician may determine their character to a greater or less extent. The ability to secure complete confidence, to exert an influence over the minds of patients, enhances, in no small degree, the skill of the physician. As belonging legitimately to the practice of medicine, this is not enough considered. But the skilful exercise of a moral power requires accuracy of diagnosis and knowledge of the laws of disease. If the physician be not able to judge correctly of the situation of a patient, he cannot give the assurances which the nature of the case may warrant; prudence, as regards his own reputation, dictates great reserve, and he depresses his patient by non-committalism. In a dispensary practice limited to affections of the chest, I have been forcibly impressed with the good which may be done in many cases by simply declaring *ex cathedra* the absence of consumption or an affection of the heart. Poor patients, after having perhaps suffered long from secret apprehension of serious disease, come tremblingly, at length, as if to hear their doom pronounced. Thanks to the invaluable methods of physical diagnosis, the healthy state of the thoracic organs may

be positively ascertained. How delightful to witness the transition from despondency to joy, when soundness of the suspected organs is announced and believed! The moral effect is often of more efficacy than any medicinal remedy. It would be easy to cite numerous instances of mental suffering with physical disorder persisting many years, for the lack of an authoritative assurance of the non-existence of a fatal malady.

It does not enter into my plan to discuss the various means by which mental influences may be brought to bear on the management of diseases. I wish only to bring forward the fact that here is an important province of conservative medicine. A topic suggests itself in this connection which I will not pass by, because it relates to a matter concerning which the opinions and conduct of medical men differ: I refer to the co-operation of the clergy in cases of disease. Some physicians take the position that during the progress of diseases involving danger to life, the ministrations of religion are liable to interfere with recovery by producing excitement and discouragement. I desire to bear testimony against this position. Divesting the topic of all considerations save those which relate to the influence upon the progress of the disease, experience has led me to have no fear of harm from the timely and judicious offices of clergymen and religious friends. On the contrary, the effect is often manifestly salutary.

If the mental functions remain intact, every patient must think of the probability or possibility of an existing disease ending fatally. There can be no stronger evidence of an imbruted mind than the absence of all thought of danger. And the doubt, uncertainty, and anxiety engendered by the patient's reflections occasion a more depressing effect than even a definite expectation of a fatal result. Every physician knows how common it is to be entreated by the patient to make known to him his actual condition, to tell him the worst, a painful state of suspense with respect to death, as well as any event involving a deep personal interest, being more difficult to bear than its anticipation. For this reason, although a certain amount of reserve may be allowable, the physician should, as a rule, meet the demands of the patient for explicit information with candour, and he should never violate the truth. The most favourable condition of mind, in a hygienic point of view, is that induced by confidence and hopefulness in union with a cheerful resignation to the will of God. In so far as the services of the minister of religion conduce to the latter, he becomes the coadjutor of the physician. Irrespective of life and health, this topic has relations to momentous interests which would be here out of place, even if the writer were presumptuous enough to consider them. I wish simply to record the opinion, as a physician having had considerable opportunity for observation, that so far from there being any ground for antagonism, the minister of religion may effectively co-operate with the medical practitioner in behalf of the physical welfare of the sick.

Attention to mental hygiene in hospitals often falls short of the require-

ments of conservatism. The violations of conservatism, in this regard, consist, in the first place, of circumstances which tend to depress the vital powers by their influence on the mind, and, in the second place, in the absence of circumstances influencing the mind in an opposite direction. Obvious sources of a depressing influence are apt to be overlooked. One of these is the necessity of witnessing the distressing manifestations of disease in other cases in the same ward. Cases which, from their character, shock or painfully excite the feelings, should, as far as possible, be isolated. To be confined in the same apartment, or, perhaps, to lie side by side with patients in a state of active delirium, or affected with convulsions, or in stertorous coma, or suffering extreme pain, is to be exposed to a depressing influence which one can best appreciate by imagining himself in such a situation. It is melancholy to think that a brutish insensibility is often the only resource against this influence. It is cruel to compel hospital patients to witness the phenomena of the dying act. How often have I seen the most marked evidence of the unfavourable effect of a prolonged agony in a hospital ward! If it be true that the patients may become habituated to these scenes, so as to regard them with indifference, is this a result to be desired! The propriety of assigning wards to tuberculous cases, or to incurable diseases, is more than doubtful as a measure of mental hygiene. What can be more discouraging to a tuberculous patient than to be surrounded with cases presenting all the different phases and gradations of consumption? For this reason consumptive hospitals are objectionable.

The circumstances just referred to may not be under the control of physicians connected with hospitals; but there are circumstances for which medical officers and visitors are exclusively responsible. It is very rarely the case that hospital patients are treated cruelly, roughly, or neglectfully; but the fact of their having the same faculties of thought and the same sensibilities as private patients, is not always sufficiently borne in mind. If this fact were not sometimes forgotten, the nature of the disease, the prognosis, and the appearances which may be expected to be found after death, would never be discussed without reserve at the bedside of a patient; the chances of recovery or death in the cases under observation, the incidents of the dead house, and other topics of a like character, would not enter into conversations held in the wards. It is but just to say that such breaches of conservatism are by no means common, and that when they do occur they proceed generally from the thoughtlessness incident to youth and preoccupation.

There is room for improvement as regards mental hygiene in hospitals, not only by obviating circumstances which exert a depressing influence, but by trying to call into exercise thoughts and feelings which have a salutary effect in disease. It is a great charity to institute for the sick poor places of refuge, furnishing shelter, nourishment, nursing, and medical aid; and for many of the miserable candidates for such a charity, a hospital ward

offers comforts far beyond those to which they have been accustomed. But supplying these needs does not fulfil all the requirements of relief; sympathy, encouragement, and religious ministrations may be added with advantage in a sanitary point of view, irrespective of other and higher objects. For this part of the hygienic management the physicians must depend in a great measure on others. And here is a field for philanthropic labour which lacks husbandmen. How few of the many who are earnest to benefit their fellows think of the sick and friendless poor in hospitals, where, by judicious words and offices of kindness, they might reap a harvest of good works, of which least in importance, although important, is the favourable influence on the course of disease! But I am entering on a train of thought which, for the medical reader, offers nothing new and is not called for, and I therefore here rest my remarks on hygiene in disease.

With this article I take leave of the subject of *Conservative Medicine*. In my first article I endeavoured to show that the term conservatism expresses the great feature of medicine of the present time, and a governing principle in medical practice. In my second article I considered the principle of conservatism as applied to therapeutics. In this third article I have offered a few fragmentary thoughts on the application of this principle to hygiene. With the rise and progress of conservatism we see a great, almost a radical change in practical medicine. This change is a legitimate result of the progress of knowledge. It is not to be expected that medicine is to be stationary; unchangeableness is incompatible with progress. There must be changes if medicine be progressive. Bearing in mind these truths, it is the part of every true physician to try to keep pace with the advancement of the profession.

ART. VI.—*On Sunstroke.* By HORATIO C. WOOD, JR., M. D., Resident Physician to the Pennsylvania Hospital.

DURING the heated term of our summers, several classes of cases of what is termed sunstroke are without doubt developed. In this paper but one of these is considered, no other having come under the notice of the writer.

CASE 1. J. B., Irishman, æt. about 30, was brought into the ward at 1 P. M., August 2, 1863. He was said to have fallen whilst walking in the street a few minutes before. He was perfectly unconscious, with very laboured breathing. His pupils were not markedly dilated or contracted, and yielded sluggishly to light. His skin was cyanosed and very hot and dry. He had vomited and passed his feces unconsciously. His pulse was

140, quick and moderately strong. He could scarcely swallow. Turpentine injections and brandy were exhibited, but he died at 5 P. M.

Autopsy two hours after death.—Rigor mortis marked. Venous trunks of the meninges of the brain loaded with dark blood. Brain substance not abnormal. Lungs congested. Heart rigidly contracted. A thermometer in thorax indicated 108° F.[1] Blood not coagulating, very dark coloured, with a slightly acid reaction. Sp. gravity 1059. 1205 grs. of blood evaporated yielded 550 grains of dry solid matter. 158 grs. of blood yielded 43 grs. of dry impure albumen. Blood corpuscles under the microscope normal, excepting that they were very dark coloured.

CASE 2. P. M., Irishman, æt. 64, a moderately stout, muscular man, was brought into wards about 7 P. M., August 10th. His skin was very hot; belly tympanitic; pulse 177, not intermittent, but very weak. He had involuntary discharges; also strange contortions of the face, owing to spasms of the muscles pretty regularly repeated at the rate of 130 times a minute. He was treated with turpentine injections, brandy, aromatic spirits of ammonia, &c. He died quietly about 11½ P. M.

Autopsy one hour after death.[2]—Brain with venous trunk of the meninges loaded with blood. Substance normal, not congested. No bloody or serous effusions. Capillaries of the lungs scarcely congested at all, but the blood pouring out of the veins when cut. Heart rigidly contracted. Kidneys normal. Thermometer in abdominal cavity 108° F. Blood very dark and fluid. Sp. gravity 1050. Reaction very slightly acid.

CASE 3. G. G., German, a soldier who had served out his time, æt. about 35, intemperate, a very large robust man weighing apparently 200 lbs. He was brought into the wards of the hospital about 1 P. M., August 10, 1863. Those that brought him in said that he had fallen suddenly whilst loading a dray about an hour and a half previous to his admission. When he was carried into the ward his skin was of a dark reddish tint, the capillaries refilling very slowly after being emptied by pressure with the fingers, requiring several seconds to do so. His pulse was 170 and upwards, very irregular and intermittent, but not excessively weak or thready. He was utterly unconscious, but laid perfectly still, without even *subsultus tendinum*. His pupils were contracted. The conjunctiva not sensitive and very much congested. His skin exemplified, *calor mordax*. A thermometer placed in his axilla indicated 109° F. His breathing was slow and very laboured and irregular. He had involuntary discharges of feces. All these symptoms grew worse and worse, his skin darkened; breathing became slower and slower; pulse failed, and before death, which occurred about 2½ P. M., dirty foam trickled down from his nose and mouth. He died quietly without convulsions.

Treatment.—Frictions with ice, brandy and ammonia as much as could be forced down him. Turpentine injections.

Autopsy one hour after death.—Cadaver very hot, no rigor mortis. Meninges of the brain with the large venous trunks loaded with blood. Brain substance normal, no exudation of blood or serum. Walls

[1] Three thermometers were compared and found to agree in these cases, so that there can be no doubt as to the reliability of the observations.

[2] Most of the autopsies previously reported were made 8—10 hours after death. In a cadaver at the high temperature of these bodies there must be putrefactive changes in that space of time.

of the abdomen and thorax with the abdominal contents loaded with fat. Lungs with their capillaries and venules not congested, but from their larger veins the blood poured freely. Heart slightly concentrically hypertrophied, very firmly contracted. Kidneys normal. Liver fatty. Bladder empty, very firmly contracted on itself. Blood very dark coloured, fluid, showing some slight indications of coagulating, but not forming more than a very few shreds.

CASE 4. C. H., apparently an Englishman, over 60, was brought into the wards of the hospital at 1½ P. M. (Aug. 11). He was said to have fallen whilst walking along the street, between one and two hours previously. When brought in he was very restless, almost convulsive; breathing laboured and noisy; pulse 170, and slightly intermittent; skin intensely hot, a thermometer in his axilla indicating 109° F. He could only swallow a teaspoonful at a time and that with difficulty. His pupils were contracted and conjunctiva dry, non-sensitive, and injected. There was some stasis in the capillaries of the skin, but it was not strongly pronounced.

Brandy, aromatic spirits of ammonia, and turpentine injections were exhibited; he was also rubbed with ice, but died in half an hour.

Autopsy one hour after death.—Cadaver very fat. Meninges of the brain with their venous trunks distended with very dark blood. Substance not strikingly congested. Ventricles distended with a large amount of slightly reddish serum. No effusion of blood. Heart slightly hypertrophied, firmly contracted. Lungs with their capillaries free from congestion, but the blood pouring from the veins when cut. Liver in a state of fatty degeneration. Kidneys normal. Spleen very much enlarged and softened. Bladder empty, rigidly contracted on itself. Blood very dark, coagulating, but not so firmly as normal.

CASE 5. P. B., Irishman, only a few days in this country. He was said to have fallen during the latter part of the afternoon, Aug. 11, whilst wheeling coal on Smith's Island, in the Delaware.

He states that he had drunk freely of ice-water, but had not sweated any; that he had no premonitory symptoms—no signs of exhaustion, no optical phantasma, no alteration of colour of surrounding objects, no headache, etc. When brought in (9 P. M.), he was in a state of semi-consciousness, but could scarcely speak intelligibly; his pulse was moderately strong, 90 per minute; surface dry, but not inordinately hot; he had no pain, but complained of great weakness; he apparently had not had involuntary discharges.

Treatment.—℞. Ammoniæ muriat. gr. x; Sp. frumenti f℥ss; Aquæ f℥j, every half hour, and an injection of an ounce of turpentine.

At 10½ P. M. his pulse had fallen to 80, and his general condition much improved. Ordered his medicine to be given every hour only.

August 12th he was entirely conscious, but very drowsy, and slept a great deal. August 14th he had entirely recovered, and regained his strength.

CASE 6. J. B., an intemperate Irishman, æt. about 33, was brought into the ward 3½ P. M., Aug. 14, 1863. His wife stated that on the 10th of the month he was exhausted with the heat, sick at his stomach, with a terrible headache, etc., so that he was forced to give up work until the morning of the 14th. When he entered the ward, his skin was moist, but

hot, and covered with a rubeoloid eruption. A thermometer between the thighs indicated 104° F. His pupils were slightly contracted; his conjunctiva was injected, but very sensitive; he had not had (as far as could be ascertained) involuntary discharges. His pulse was 140, rather feeble; he was entirely unconscious, but muttering to himself unintelligibly, and very restless. He vomited freely.

Treatment.—Cold water poured by the bucketful over head and breast, turpentine injections.

At 4 o'clock his restlessness was replaced by convulsions, with opisthotonos. These convulsions lasted some five or six minutes each, and were somewhat epileptiform; but as there was no saliva he did not foam at the mouth, although his jaws worked violently; his breathing was for the most part very hurried, shallow, and irregular, but occasionally laboured and slow. He passed a few drops of urine, and the injection operated on his bowels. Brandy was attempted to be exhibited, but it always brought on immediately fearful convulsions, probably owing to the difficulty of deglutition. The cold effusions lowered the temperature of the skin, but did not resuscitate him in the least.

At 4½ o'clock the douche was repeated, but this time threw him into violent spasms, with vomiting, and great congestion of face. From this time his symptoms deepened, his body became very dark blue or purplish, and he died quietly at quarter past five. No post-mortem could be obtained. This case differed somewhat from the others—was the previous exhaustion the cause?

CASE 7. An Irishman, æt. apparently 40, a stout, muscular, but not fat man, was brought into the wards Aug. 14th, about 8 P. M. He was said to have fallen about 3 o'clock. When he was carried in, he was perfectly unconscious, somewhat restless, with *subsultus tendinum*, as well as more decided muscular twitchings. His tongue was very dry, his skin was dry and harsh, hot, but not so excessively so as in some cases. A thermometer in his axilla indicated 104° F.; his pupils were slightly dilated; conjunctiva injected; pulse 150, weak, not intermittent, but somewhat fluttering; breathing 48 per minute, and very laborious; he could swallow only with difficulty. Before he came in, he had had mustard sinapisms on legs, stomach, etc.

Ordered brandy f℥iij, immediately.

At 9 P. M. his condition was unchanged, excepting that his pulse was more fluttering and marked. Ordered brandy f℥j every half hour.

His symptoms went on from very bad to worse, and he died quietly about 11½ P. M.

Autopsy one hour after death.—No rigor mortis. Meninges of the brain, with their large venous trunks full of dark blood. Substance of the brain very slightly, if at all, congested. Ventricles with considerable serum in them. No effusion of blood. Lungs with their capillaries not congested, but the blood pouring from their veins when cut across. Heart rigidly contracted, walls somewhat thickened, and very firm. Liver very large and fatty. Kidneys somewhat congested. Thermometer in abdominal cavity 106° F. Blood very dark and fluid, with a decidedly acid reaction.

CASE 8. C. B., German, a large and very muscular man, was brought into hospital about 12½ P. M., August 15th. His skin was very hot and dry; a thermometer in axilla indicating 109° F.; he had passed his feces involo-

luntarily, and a little urine after his admission; his pupils were about normal in size; conjunctiva injected; mouth moist; deglutition almost impossible; he had a severe convulsion shortly after his entrance, and died in less than an hour. There was a large ecchymosis in one axilla. He fell whilst working in a sugar refinery where the heat was intense, and was brought immediately to the hospital.

Autopsy two hours after death.—Meninges of the brain, with their veins filled with blood. Some serous exudation in ventricles, but scarcely more than normal. Lungs with their capillaries not congested, but the blood pouring from their veins when cut across. Heart rigidly contracted. Liver very fatty, with its veins loaded with blood. Thermometer in abdomen indicating 110¾° F. Blood decidedly acid, very fluid, without a sign of coagulation; under the microscope, the red globules were possibly a little more opaque than normal, and aggregated in rouleaux and masses. No abnormal proportion of white corpuscles.

Remarks.—Sunstroke is often preceded by well-marked prodromes. Dr. Swift speaks of subjective optical sensations, of all surrounding objects being coloured, and Dr. Taylor (*Lancet*, 1858) of a violent and peculiar pain in the hypogastric region as being frequently present in their cases before the attack.

Case 5 is the only one in which I have been able to make any observations on this point. This patient was questioned repeatedly and very carefully as to any unnatural feelings, any sense of exhaustion preceding his attack, and his answers were so consistent as to establish the fact that there was in him nothing whatever to give intimation of what was about to happen, except it were great thirst and diminished excretions. When an individual falls, he does so suddenly, and instantly loses all knowledge, either of the surrounding world or of the microcosm within. If he recovers, that period is a total blank in his remembrance. In the fully formed disease, the unconsciousness is perfect, but reflex action is not suspended, at least in most cases. I have seen convulsions excited by an attempt to administer brandy, and sometimes touching the conjunctiva will produce violent contractions of the muscles of the face. Convulsions occur frequently, and may be very severe. Every manifestation of disordered cerebro-spinal action, from subsultus tendinum to eclampsia, takes place. One case had been subject to epilepsy, yet he had no convulsions whilst in the wards of the hospital. The skin is frequently cyanosed, and sometimes has ecchymosis beneath it. A better example of calor mordax is seldom seen, and the thermometer indicates a remarkably high temperature. The range in an instrument placed in the axilla has been in our cases from 104° to 109° F. In the body which manifested the last degree a thermometer, placed in the abdomen shortly after death, showed 110¾° F. The cases in which the greatest altitude is reached, are those where there is the greatest destruction of the blood crasis. The pulse is very rapid and quick, and often, in the earlier portion of the attack, not devoid of force.

The pupils in the early stage are mostly moderately contracted, and are either insensible to light or respond very sluggishly to it. As death approaches they often become widely dilated. The conjunctiva is always more or less injected and dry, and sometimes insensible to the touch. The tongue may be dry and chapped, or it may be moist. In some individuals the salivary glands secrete a dark abnormal saliva—in others, they cease their work. The breathing is always laborious, very generally rapid as well as deep, and, in many instances, it is evident that there is no paralysis of the phrenic nerve, that the lungs are ready to do their share in depurating the blood, and that the non-oxygenated condition of the life fluid is owing to what Virchow denominates paralysis of the red corpuscles. Vomiting almost always takes place; watery bilious matter, with the contents of the stomach, being rejected. The renal secretion appears to be entirely suspended. It would be very interesting to know whether it was so before the attack or no. But as liquid involuntary discharges from the bowels took place in most of the cases before admission, it was impossible to judge. A few drops of urine were passed by one or two whilst in the ward. The probability is, that the function of the kidney is very materially diminished, but not altogether suppressed before the affection manifests itself. I have not seen hemorrhages from any mucous surface, but see no reason why they may not occur. These symptoms generally grow worse and worse, the patient weaker and weaker, and the case runs on to a fatal termination. The approach of death, although rapid, is insidious. Convulsions, when present, subside, and the end is brought on by loss of power in the central nervous system. Very rarely recovery takes place. Then the symptoms subside, the pulse falls, and life begins to dawn on the patient. The return of consciousness is slow, and unpleasant sequelæ are said sometimes to occur, but in the case in this hospital the patient in forty-eight hours was perfectly recovered.

The results of the autopsies were both negative and positive. There was a total absence of all inflammatory products, or any signs of active congestion. The blood was found very fluid, dark coloured, with an acid reaction, and a loss of its power of coagulating. The *heart* was, in all the cases, *rigidly contracted.* The veins were surcharged with blood. Must not the symptoms of this malady be owing to one of the three following causes: 1. Inflammation or active congestion. 2. Nervous exhaustion. 3. Morbid condition of the blood. That it is not owing to the first, the autopsies abundantly certify. Exhaustion is manifested by general loss of power, accompanied by relaxation of the whole system, a feeble, although it may be quick pulse, and a cool, moist skin and disturbed sensorium. There may be, indeed, apparent strength, but this is merely simulated, and is characterized by convulsions, jactitation, and great restlessness. If the symptoms of uncomplicated mania-a-potu, which may be taken as the

type of the class, are examined, is not this description seen to be correct? Is not a hot, dry skin present in any supposed case of delirium tremens an unerring indication of the existence of more than that disease? is it not significant of the presence of some inflammation or blood-poison? Further, is not exhaustion gradual in its approaches? How, then, can the suddenness of the attack and the hot, dry skin be reconciled with the idea of nervous exhaustion? Is it at all consistent with the character of the latter class of diseases, that a man, strong and robust, should one moment be in full vigour, and the next, utterly without warning, be stricken down as by a flash of lightning? In an autopsy after fatal exhaustion, flabby muscles and a worn-out heart would be the lesions naturally looked for. The nervous system has a wonderful influence over the whole economy, but in what simple nervous disease are changes wrought in the blood? The blood is frequently abnormal, but as a preceding, not consequent phenomenon of the nervous disorder. It seems utterly foreign to all the present knowledge of the pathology of the nervous system, that nervous prostration should in a few hours totally destroy the coagulability and alkalinity of the blood.

If sunstroke be not owing to inflammation nor yet to exhaustion, it must be due to some alteration in the blood. Now, what class of people are most obnoxious to blood diseases? The unacclimated and intemperate. Who are almost the only persons attacked by *coup de soleil*? The unacclimated and intemperate. How do blood diseases commence? Most generally they are preceded by prodromes, but very frequently they develop in an instant their full force. Witness scarlatina maligna, pernicious fever, &c. What obstetrician has not seen his patient, previously without a bad symptom, perhaps whilst he is congratulating her on her safe delivery, instantaneously seized with a convulsion? How does sunstroke begin? Most generally prodromes presage its coming, but frequently its victim is stricken down utterly without warning. After the first manifestations of a blood disease, there is generally a paroxysm of fever. So is there in *coup de soleil*. For could any set of symptoms agree more thoroughly with Prof. Wood's definition of fever, which is as follows [*Practice of Medicine*, vol. i. p. 90]: "Fever is an acute affection, in which all the functions are more or less deranged; the most striking phenomena being sensorial or nervous irregularity, increased frequency of pulse, increased heat, and disinclination for food." Ecchymoses are characteristic of an altered blood. They occur in sunstroke. There is also an odour peculiar to this malady which finds its analogue among the blood affections. Scarlatina maligna, puerperal convulsions, &c., occasionally prove as rapidly fatal as sunstroke. Finally, the pathognomonic post-mortem results of a fatal blood disorder are alteration and destruction of the crasis of the life-fluid, without structural change in the solids. This is precisely what is found after death from *coup de soleil*.

The true pathology of the disease appears, then, to be as follows: The excessive heat causes a suspension of the functions of the excretory glands, and produces changes in the life-fluid probably more than the simple retention of effete material. These alterations in the blood are trifling at first, but are progressive, so that in a short time some agent or agencies are evolved capable of producing the fearful cerebral symptoms. The name of "sunstroke" is very indefinite, and if the pathology advocated in this paper is correct, thermohæmia or thermic fever would be more in accordance with the modern system of nomenclature.

The preventive treatment of this malady is, of course, to avoid the cause. But there is a popular prejudice, that drinking cold water is injurious. This in former times was held by the farmers around the city, and it was thought necessary to guard the water with ginger, &c. But all this has been abandoned, and ice water is now used *ad libitum* through the country. The cause of this prejudice is probably that the commencing blood changes and great heat of the body create excessive thirst. If the glandular system can be kept active, there is much less danger to be apprehended; and is not water a powerful stimulant to the secretions? Is it reasonable, that water should be withheld from a system whose blood is being deprived of its serum, it may be, by pints, through the perspiratory glands?

The treatment of the fully developed disease has been in our hands utterly futile. The case that did recover would have done so if nature had been left to herself; in all the others, the condition of the blood, when brought in, precluded all hope. I know of no agent that will check directly the tendency to degradation of the life-fluid. The regular treatment in this hospital is to give a turpentine injection, and administer stimulants. Both of which are in most cases of no avail. The indications are first to check the changes in the bloqd, and secondly, support the system. But unless the first can be fulfilled, the second is useless. Dr. Taylor (*loc. cit.*) states, that he did not lose a case during April, 1852, when many were stricken down with well-marked symptoms, and when he practised cold affusions, water being poured on them continuously, until they showed signs of returning consciousness. This result is so wonderful as to make one doubt whether there is not some difference in the disease as seen in the East Indies and in this country. But the plan certainly ought to be tried, as it may possibly check chemical change by reducing the temperature, and at the worst can only be equally hopeless with all the others.

ART. VII.—*Case of Resection of the Head and Upper Third of the Humerus for Enchondromatous Tumour.* By HANFORD N. BENNETT, M. D., of Bridgeport, Conn.

SOME time in the month of May, 1860, Mr. Henry A. Andrews, of Brookfield, Conn., a farmer by occupation, discovered a tumour upon the outer face of his right arm, directly underneath the belly of the deltoid muscle. Its discovery was altogether accidental; it had been preceded by no local pain, had already attained considerable size, and could be traced to no cause except it might be the severe muscular exertion incident to the patient's calling. I was consulted soon after and found, upon examination, a tumour of bony hardness, about the size of a hen's egg, immovable, with no irregularities of the surface, and not tender to pressure. Thinking that it might be a simple exostosis, I advised no operative procedure, but merely care in the use of the limb. I did not see the case again until August of the following year. The tumour had now attained large dimensions, having extended upwards nearly to the head of the humerus, and the whole of the deltoid being stretched over its surface. A similar growth was also projecting from beneath the outer edge of the deltoid muscle, covered only by the skin and cellular tissue, nearly globular in form, and exhibiting a slightly nodular surface to the feel, which was not at all discoverable beneath the thick belly of the muscle. I could not now doubt that the tumour was an osseous or osteo-cartilaginous outgrowth. It was already impairing the use of the limb, especially in those movements controlled by the deltoid, and I advised the patient to submit to an operation as soon as he could arrange for that purpose. Various circumstances, however, prevented a compliance with this advice, until the 8th of January, 1862, when he presented himself for operation. The arm being now measured over the largest portion of the tumour, was seventeen inches in circumference, and the outgrowth extended from the neck of the humerus to the insertion of the deltoid, presenting no irregularities except that which projected from beneath the outer edge of this muscle, the main body of the tumour being of very symmetrical rotundity. The patient suffered no pain in the affected part, and no inconvenience except the loss of the horizontal motion of the arm, and a sense of weight which was now beginning to be considerable, and which would have undoubtedly soon produced relaxation of the ligaments of the joint, and finally luxation of the head of the bone.

The history of the case and the perfectly healthy appearance of Mr. A. led me to believe that the tumour was benign in its character, but its growth had been somewhat rapid, and the diagnosis could but be uncertain. In view of all the circumstances, I proposed a resection of the bone and outgrowth rather than an amputation at the shoulder joint, and with this intention

called Dr. Jonathan Knight, of New Haven, and several of my medical friends of this city to consult upon the case, and if thought advisable, to assist at the operation. The result of the consultation at this time was unfavourable to an attempt at resection, its feasibility being questioned in consequence of the large size of the tumour, and the ulterior usefulness of the limb being doubted from the extent of bone which must necessarily be removed. It was agreed, however, that a small incision should be made down to the tumour, for the purpose both of ascertaining the relations of the outgrowth to the bone, and of determining its true pathological character; if it should be found that the bone was not involved so as to necessitate the removal of the head, then I was to attempt an exsection merely of that portion of the shaft of the humerus included in the disease. The examination proved conclusively that no operation short of a resection involving the head of the bone was practicable, and this was negatived. A minute piece of the foreign growth was removed and examined with the microscope and its non-malignant nature thus rendered quite certain. The patient was now dismissed to await the further progress of the disease, as I had determined not to amputate the limb until such time as it should become an absolute necessity. The small wound made at this time, however, could not be healed in consequence of the extreme tension produced by the outward pressure of the tumour, and suppuration became very profuse, so much so that it soon told seriously upon the general health of my patient. He rapidly emaciated, and in short presented all the constitutional symptoms of suppurative irritation, so that at the end of five weeks it became evident that something must be done immediately, and notwithstanding the apparently unfavourable condition of things, I determined to attempt the resection.

On the 14th day of February, 1862, I proceeded to the operation, assisted by Drs. Wm. B. and David Nash, Drs. Hubbard, Burritt, and Gregory, all of this city. I adopted the method of Larrey, the only one, in fact, practicable in this case, and, the patient being put fully under the influence of ether, I made an incision along the outer face of the arm, directly over the most prominent part of the tumour, commencing just above the point of the acromion and terminating a short distance below the insertion of the deltoid, thus completely bisecting this muscle (which was much atrophied) in the direction of its fibres. Two arterial branches were divided, which were immediately tied in order to lessen the amount of hemorrhage as much as possible. I was able to detach the integuments from a considerable portion of the outer and more prominent surface of the tumour by the aid only of my fingers, and then having carefully separated the periosteum from the bone immediately below the excrescence, I passed a spatula underneath the humerus and sawed it off just at the insertion of the deltoid. Having now command of the bone, it was not difficult, by a careful dissection, to sever the connections with the muscles; I

succeeded, also, in saving a narrow strip of healthy periosteum, varying from half to three-fourths of an inch in width, along the inner face of the bone almost to its neck. After finally dividing the insertions of the pectoral and latissimus dorsi muscles, using the bone as a lever, its head being rotated forwards and outwards, the capsular ligament was divided and the resection completed. I should add that care was taken to preserve the tendon of the biceps. The wound was now closed with sutures and adhesive straps, and having flexed the forearm so that it would lie horizontally across the abdomen, I fastened the entire limb in this position to the trunk by long adhesive straps reaching well around the body. The patient was much prostrated by the operation, but rallied quickly from the effects of the ether, and after the administration of a full dose of sulphate of morphia, slept quietly about two hours. From this moment the case progressed steadily to a complete healing of the wound, and to a perfect restoration of health. A somewhat profuse suppuration commenced a few days after the operation, but the appetite and digestion being excellent, the waste was supplied, and Mr. A. gradually gained strength, so that at the end of five weeks he was enabled to go home by railroad, a distance of twenty-five miles. The external wound was now healed, with the exception of two points from which the pus issued, and I instructed the patient to commence passive motion of the forearm, the movements of the hand having been at no time impaired. Suppuration ceased entirely at the termination of the sixth week, and the wound was permanently closed. In the month of May following (three months after the operation) the Connecticut State Medical Society met in this city, and I presented my patient to this body. The flexion and extension, pronation and supination of the forearm, were already nearly perfect, and the limb, in walking, hung in a natural manner; so much so that no one would observe any alteration in its carriage. From that period the strength, and consequently the usefulness of the arm, have steadily improved up to the present time, though the horizontal movement is of course lost. At this date, sixteen months after the operation, I have just received a letter from Mr. Andrews, in which, speaking of the usefulness of the arm, he says he "*can plant corn as fast as any man.*" The limb has shortened nearly an inch and a half, and I am satisfied, from an examination which I made on the 1st day of April of this year, that there has been a slight reproduction of bone up to within two inches of the glenoid cavity.

Remarks.—An examination of the tumour after its removal showed a conglomerate of cartilage and bone, which had sprung from the surface of the humerus, and had been developed in nodules of cartilage, which ossified from their centre, thus imitating the normal process of the ossification of cartilages. The form of the outgrowth had evidently been moulded to a considerable degree by the action and resistance of the deltoid, and this muscle seemed as it were to grasp the tumour beneath its fibres, with the exception of that portion which projected beneath its outer edge; between

this and the main body of the excrescence was a deep sulcus, evidently formed also by the action of the muscle. The outgrowth did not entirely surround the bone, but left intact a narrow strip on the inner face, from which, as I have before stated, I detached and saved a small portion of healthy periosteum. The length of bone removed, including the head, was five and a half inches; the tumour involved it from the neck of the humerus to within half an inch of the point at which is was sawed off, and was thirteen inches in circumference at its largest part, measuring in the direction of the circumference of the bone.

I was not aware, at the time of this operation, that resection of the head of the humerus for bony tumour had been so rarely performed. As far as I can learn, my case is the first in this country, and the records of European surgery furnish only five examples of analogous character. Dr. Hodges, of Boston, in his admirable monograph on excision of joints, mentions four of these, viz., two by Mr. Hutchinson, one by M. Roux, and one by Bickersteth. The three first were unsuccessful in their results, as the disease was in each instance of malignant nature, the patients either dying soon after the operation, or later from a recurrence of the disease. The case of Mr. Bickersteth was a simple exostosis, and the operation was undertaken for the purpose of relieving the motions of the joint, the result being satisfactory. Prof. Syme has also operated successfully in a case of bony tumour (non-malignant) involving the head of the humerus, his patient recovering with a useful arm. As I have never read the report of this case, I am unable to say certainly what was the extent of the resection, but believe it involved less of the shaft of the humerus than my own.

Prof. G. B. Günther, of Leipzig, in the edition of his large work on operative surgery now in course of publication (*Lehre von den blutigen Operationen am menschlichen Körper*), has a table of seventy-six cases of resection of the head of the humerus, chiefly drawn from the records of continental surgery, but not one of these was for bony tumour, the whole number being made up of resections for gunshot wounds, caries, or compound or comminuted fractures.

It will be seen from the cases thus far recorded, that those for bony tumour of a malignant nature have all been unsuccessful, while those of a benign character have all been successful, both as regards the recovery of the patient and the usefulness of the limb; so that although the cases are too few in number from which to draw accurate conclusions, yet as far as they go, they indicate the propriety of resection in cases of non-malignant disease in preference to amputation at the shoulder-joint. And even in malignant affections of the bone, it is questionable whether the results thus far attained favour amputations at the joint in preference to resection, since the statistics of the amputation, even under the most favourable circumstances, present a frightful percentage of mortality.

BRIDGEPORT, CONN., July 2, 1863.

ART. VIII.—*Excision of the Os Calcis.* By Assistant Surgeon C. R. GREENLEAF, M. D., U. S. Army.

SERGEANT THOMAS C. BARBIN, Co. C., 81st Regiment Pennsylvania volunteers, aged 18 years, native of Philadelphia, was admitted to the Mower U. S. A. General Hospital, Chestnut Hill, on the 15th of January, with a gunshot wound of his right heel.

At the battle of Fredericksburg, Dec. 13, 1862, while in the act of leaping a fence, he received a wound from a conoidal ball, which entered the os calcis on its external surface, and, passing forwards, inwards and slightly downwards, made its exit from the inner surface of the bone near its articulation with the astragalus. Considerable hemorrhage attended the wound, and at a house near by a bandage was applied, and he was sent on to the Mt. Pleasant Hospital, Washington, from whence he was shortly afterwards, in company with others, transferred to Philadelphia. No careful examination of the condition of the wound was made, on his admission, owing to the swelling of the soft parts; cold water dressings, and perfect rest, was the only treatment used. Pus was discharged very freely from the wound, and occasionally small portions of the cancellated structure of the bone came away. Several abscesses formed both on the inner and outer side of the foot, and on opening were found to communicate with the bone.

On the 12th of May (five months after the receipt of the injury), the bone showing no signs of healthy action, it was decided, after a consultation, to excise it, and, accordingly, on the 16th, assisted by Drs. J. H. B. McClellan, C. R. Maclean, and others, I proceeded with the operation, the patient being under the influence of chloroform. An incision was commenced on the external surface of the foot, a little in front of the calcaneocuboid articulation, and carried in a direction parallel to the long axis of the foot, around the heel to a point about five lines posterior, to the posterior tibial artery; the flap thus formed was dissected down, the knife being kept close to the bone. Some hemorrhage which occurred was easily controlled by the use of Monsell's solution. Another incision was then made at right angles to, and joining the first, through the tendo-Achilles, about two inches in length; these flaps were dissected off, and the disarticulation commenced from behind; some difficulty was experienced in separating the calcis from the astragalus, owing to a bridge of callus which was thrown across this articulation, and which had to be cut through by the bone-nippers. No arteries required ligation. The flaps were then cleaned off and brought together by silver wire sutures, an opening being left at the juncture of the vertical with the horizontal incisions for the drainage of the pus. The patient was placed in bed, a cloth saturated with cold water was laid over the wound, and half gr. morph. sulph. was given. The bone was found much shattered, and its internal structure filled with pus; the

cartilage at the astragaloid articulation was eroded, and callus had been thrown across from the sustentaculum tali, uniting the calcis and astragalus.

Some slight febrile action was controlled by diaphoretics, and on the 18th the leg was placed in a Smith's anterior splint, and suspended to a frame over the bed, thus allowing free access to the wound, and good position for the drainage of pus. On the 21st there was some puffiness of the flaps, owing to the closure of the opening for the escape of fluids, which was reopened carefully by a probe, and a tent introduced, a large quantity of grumous matter escaping. The incisions have all healed by first intention, and the sutures were removed. From this date, he continued to improve, and on the 9th of June was moving about the ward on crutches.

July 8th, completely recovered. The wound is thoroughly healed, and a firm elastic cushion has taken the place of the calcis; by placing a soft pad in his shoe he is able to move about on the foot, with the aid of a cane; the cicatrice is well upon the posterior part of the heel, and any amount of pressure can be borne without pain. Permission was now given the patient to remain at home with his parents for a few weeks. He returned to the hospital on the 1st of August, able to walk perfectly well without a cane; has no pain, and suffers no inconvenience from the operation.

MOWER U. S. HOSPITAL, Aug. 16, 1863.

ART. IX.—*Case of Fracture of the Coronoid Process of Ulna.*

By EDWARD L. DUER, M. D., of Philadelphia.

IT having been my fortune, just now, to meet with a case of, to my mind, undoubted fracture of the coronoid process of the ulna, the exceeding rarity of which is so ably borne testimony to by Prof. Hamilton and others, I am induced to believe that a history of the case will be acceptable to the profession, in order to the more full intelligence of the subject.

CASE. W. B., a stout, hearty little fellow, six years of age, came under the charge of Dr. Howell, an intelligent and experienced physician of Allentown, N. J., the 30th day of April last, having just tumbled, headlong, from a rick of hay to the barn floor, a distance of about five feet, and presenting a seemingly uncomplicated dislocation backwards on the humerus, of both bones of the right forearm. The Dr. states that the dislocation was readily reduced, accompanied with a decided snap, by moderate extension and counter-extension, whilst the arm was slightly flexed and supinated, and was thus maintained by supporting the hand in a sling, with the forearm at an angle of about eighty degrees with the arm. This, indeed, alone constituted the dressing. Three days later, when the Dr. again saw the case, the sling had become so elongated as to permit of the arm's making a much greater angle than when first arranged, but the elbow was much swollen, and nothing wrong was suspected. The hand was again elevated

and the patient dismissed. When next seen, two days afterwards, the tumefaction had subsided somewhat, and the Dr. was struck with the peculiar conformity of the joint, but an inquiry did not suffice to elicit its real condition.

June 15. Nearly seven weeks after the accident the opportunity was presented me of seeing the case with my father, in consultation with Dr. Howell. The following condition was then noted, viz.: the arm hung by the side, nearly straight, but inclining slightly toward the ulnar side; the hand was supinated; accurate measurement from the styloid process indicated a shortening of about five lines; from either acromion to the condyles the distance was the same for both arms; pronation and supination were alike perfect, as was extension, but flexion could not be effected to less than a right angle. All tumefaction having subsided, and the muscles being naturally flaccid in a child so young, every condition was present for a ready manipulation and inspection of the joint. The olecranon was about half an inch above the level of the internal condyle; the thickness of the arm, antero-posteriorly, at the joint, whilst the limb was extended, was somewhat greater than that of the sound side, but not so thick as would have been the case had the coronoid been present in its proper place in the ulna; the width at the same point was normal; the biceps was tense and prominent in this position of the arm; the trochlea and radial head of the humerus were readily definable; and the arm being somewhat flexed, the detached portion of the coronoid process lying in front of the joint could be distinctly felt, and freely moved in any direction over a small space. The olecranon was also much more salient backwards in the bent position of this limb, than in that of the sound side. All of us agreed fully as to the conclusiveness of the symptoms.

Suffice it to say of the treatment of this case, that every justifiable effort was made to reduce the dislocation, without success; hoping, should we accomplish this, there would be a sufficient amount of inflammatory action excited to throw out reparative material enough in front of the greater sigmoid cavity of the ulna to maintain the forearm *in situ naturali*. Failing in this, we were obliged to dismiss the case as incurable; feeling less reluctance, however, in so doing, in consideration of the great amount of usefulness yet left to the boy, in the unimpaired pronation, supination, and extension of his arm.

ART. X.—*Notice of the Yellow Fever as it occurred at Key West and in the U. S. East Gulf Blockading Squadron, in* 1862. By G. R. B. HORNER, M. D., Fleet Surgeon.

AFTER many days of hot weather, the thermometer ranging from 84° to 87°, it was reported on the 29th of July that three of the workmen at Fort Taylor had died of yellow fever; then, day after day accounts were received of the disease prevailing among the labourers, mechanics, and soldiers at the fort and barracks, on the northern side of Key West. The fever became particularly prevalent and fatal among persons employed in the construction of a new fortification between the back of the fort and the inlet, these persons being exposed to the intense heat of the sun. But I have

ascertained that the very first case of the disease which occurred at Key West was on board the English bark Adventure, which arrived in distress early in July. That case proved fatal, and the deceased was interred on the 6th, as shown to me in the accounts of Mr. Davis, carpenter and undertaker. The next death, agreeably to his record, and the statement of Mr. Murray, steward to the engineers' hospital, was that of a cook, named Goodman, who died July 27, and came there from a steamer. These cases, however, appear to have been sporadic, and to have had no connection with the multitude of subsequent cases. The first of the epidemic cases, which appeared on board ship and in the harbour, were, so far as I can learn, in an American bark, the Sparkling Sea, laden with bricks for the fort, and at anchor a short distance from the new fortification. Her whole crew became affected, and probably owing to the want of early medical attendance five out of six died at the Marine Hospital, where they were sent in the last stages of the fever.

The first case of it which came under my notice was that of a young black refugee, William H. Talbot, of the San Jacinto, who had some days previously to July 26 been for part of a day in town. In the evening of that day he complained of a diarrhœa and griping, and was given two doses of laudanum. The next day he was very weak, had stupor and involuntary stools, and fever, which seemed to be typhoid. On the 28th he was sent to the Marine Hospital, was seized there with black vomit, and died on the 30th. On that day and the preceding five more cases occurred in that ship. The second case was that of Daniel J. Dresscoll, who died at the hospital with the vomit August the 1st. Among these cases was also that of Mr. Howland, master's mate, who the day before while exposed to the sun on shore, was seized with such severe headache and vertigo that he was near falling in the street. At the same time he partly lost his sight, and when he got back to the ship, had high fever with flushed face; full, strong, rapid pulse; a continuance of headache and constant nausea, without ability to vomit until given a solution of tartar emetic. He afterwards took a cathartic—the neutral mixture—and subsequently quinia. He was then sent to the hospital, where he recovered, but his eyes continued jaundiced for weeks.

By the 1st of August eleven cases of the fever had occurred in the San Jacinto, and as it was plain they would continue to appear as long as the ship continued at Key West, Rear-Admiral Lardner, at my recommendation, ordered her to proceed north, and shifted his flag to the St. Lawrence, which had been lying at Key West, with the exception of a short cruise, since the month of May. On the 2d of August he went on board the latter vessel, with his staff. Soon afterwards I found that Albert Kerscher, a tall young German and sergeant of marines, was being treated, with two others of her crew, for bilious fever, having been taken on the sick list for it on the first of the month. As soon as I saw him I became convinced from the dark-red glazed appearance of his eyes—the low type of the

fever—and other marks, that he had typhus icterodes. He died on the fourth in a comatose condition. Afterwards I formed the same opinion of the other two cases, though both got well. On inquiry I learned that Kerscher had been in the town some days before he had the fever. No case occurred in the frigate after the three preceding cases until the 12th, when master's mate Theophilus Griffith was attacked severely, with well-marked yellow fever. On the 14th and 15th two faintly marked cases appeared, but they were such from the patients having so deadly a dose of the poison that their systems had no power of reaction. The first case was treated first for constipation and then debility; the second case for nephritis, from the intensity of pain in the loins. The true nature of their disease was made known to me by their comatose state, low frequent pulse, injected sallow eyes, and the dingy-yellowish colour of their skins. One also had sordes about the teeth. He was sent to the hospital, had the black vomit there, and died on the 22d; but the other case had none, and died on board ship upon the 16th, the day after he was put on the sick list. His habits were intemperate, he became pulseless long before death, and no reaction whatever took place during his illness. By the close of August the fever had become epidemic in the St. Lawrence, and 38 cases had occurred in her. During September the weather continued sultry—rain fell in showers for twelve days; the thermometer was only one day as low as 81°, it averaged nearly 85° the whole month, and 84 cases of the fever took place. During October the weather became less hot and wet, and only 18 cases occurred. From that time the number varied, and the disease assumed a milder type. In November there were only 16 cases, in December 11, January 21, February 5, March 11, April 3, and May 4—total 212; of which 36 died, or 1 in $5\frac{32}{36}$; a part died in the ship and the rest in the marine hospital.

During the prevalence of the fever in the St. Lawrence it infected many other men-of-war and merchant vessels at Key West, but chiefly those which were lying by the wharves for coaling, or delivering and taking in cargoes. I learned the names of twenty-four of these infected vessels, some of which, as the Cuyler, and Rhode Island, became so at the U. S. naval wharf and depot. The former was at the wharf only about thirty-six hours. The Huntsville, Dacotah, Tahoma, and Morganton suffered in like manner. The U. S. armed corvette, James L. Davis, was the last man-of-war infected. She arrived at Key West on the 29th of October, and anchored about a quarter of a mile from the town. On the 15th of November two cases of yellow fever happened in her; these were sent to the hospital, and got well. But 17 more cases occurred in her at sea and on the western coast of Florida, where she was forthwith dispatched at my recommendation, and of these, two ended fatally.

In the Huntsville, the first person affected with the fever was Lieut. Commanding Wm. C. Rogers, who had been frequently on shore. Soon

after his recovery the ship put to sea, but returned in eight days, the disease having become prevalent in her, and proved fatal to two officers, Acting Paymaster E. D. Burton, and Acting Assistant Surgeon G. D. Gould, both very estimable young men, and to one man. The fever subsided in her a short time after she returned, but soon reappeared and made a victim of Mr. Rose, her chief engineer, who told me he had had the yellow fever at New Orleans seven years previously. Second attacks occurred to a number of other persons in the squadron, and likewise to citizens; the Rev. Mr. Herrick, of the Episcopal Church in Key West, who had the fever there in 1857, was attacked. In the Tahoma, only one case of it appeared, that of Acting Master Henry A. Hurley, who died. The disease attacked the crew of the Dacotah after she left port. She immediately returned to it; fifteen cases occurred in her, and though mostly very mild, at the recommendation of Surgeon Bloodgood, approved by me, she was dispatched to the Atlantic, and more cases of the fever occurring, she went to New York, where three of them proved mortal, as I learned from Captain McKinstry, her commander, but none on the passage. In the Magnolia, the first cases also happened at sea, others at Key West, at intervals, and three died. The Cuyler arrived there from Boston on the 20th of August; on the eighth day afterwards I found her medical officer, Acting Assistant Surgeon W. Argyle Watson, affected with some slight symptoms of the fever—suffused eyes, furred tongue, some sallowness, frequent pulse, and languor. Her worthy and intelligent commander, Lieut. Francis Winslow, though he valued his surgeon's services much, as no other cases of fever were on board, and he was certain of meeting the Huntsville at sea and getting her medical officer if wanted, put to sea immediately, on a cruise. But the fever becoming epidemic in the Cuyler, she made for Boston, before reaching which Lieut. Commander Winslow died of the fever, and Acting Lieutenant J. Y. N. Philip became affected with it. He died shortly after her arrival, but I have not heard of any more deaths in that vessel. For similar reasons, of a more urgent character, it became necessary that the St. Lawrence should also depart to some northern port, but she was the only suitable vessel for a flagship on the station. Dr. Pearson, my only assistant surgeon, had taken the fever, was unfit to take charge of the sick, and my own services in the squadron could not be spared to go home in her. For these reasons she remained at Key West, and continued to be afflicted with yellow fever. But in November it was of milder type, both in the harbour and on the island. No death occurred among my cases after one on the fifth of that month, and the deceased was known to have been a hard drinker. Indeed, such had been the fatality of the fever among topers, that unprofessional persons would prognosticate correctly the termination of the disease, according to their knowledge of the habits of the patients. Those too who were scorbutic, of dark bilious complexions, and subject to local disorders, were the greatest sufferers.

As a class, our marine guard of forty men, who were mostly young northern men, lost the largest number, ten of them having died of the fever. Many of the guard were Germans and Irishmen. The least liable to this, were the boatmen of the ship, who were little in her, were constantly during the day rowing in the open air, and were young vigorous men. In the whale boat, which took me on shore and from vessel to vessel, of 13 men, including the coxswain, only two got the fever; one of them was Samuel Gail, of Philadelphia, who was very sallow, though stout, and died comatose. The other did not take the fever until the 2d of January, and after he had left the whale boat. Persons much confined to the ship, and among the sick, were infected in large proportion. Her paymaster, J. P. Oliphant, his clerk and steward; the surgeon's steward and two regular nurses, and Dr. Daniel Thacker Lewis, resident physician of the Marine Hospital, became victims; and my three very able assistant surgeons had the fever—Assistant W. K. Vanreypen, at the hospital, Assistants Pearson and Shirk, in the St. Lawrence. Dr. Lewis was taken sick on the night of August the 23d, after great fatigue and much watching at night; had the fever of a high type, suffered much pain in the loins, left the hospital after the fever subsided, seemed to have a good chance of recovery, but was seized with black vomit and stools, and died on the 3d of September. As soon as he was taken sick, Collector Charles Howe applied for a surgeon to the hospital. I volunteered my services August the 24th, took charge of it, and was enabled to see the fever as it affected persons from other men-of-war than the Jacinto and St. Lawrence, and also merchant seamen, and some other civilians who had not fled like a host of mechanics and labourers from the island to escape the pestilence. Of these cases there were 54 altogether, and of them 14 originated in the hospital. Two went there well, and 12 had gone for other complaints. But it was a subject of regret to me that owing to the want of a room or dead-house, until I lately had one built, the rapid decomposition of the dead, and my want of time, I was not able to make any post-mortem inspections.

Symptoms.—With very rare exceptions persons when taken with the fever complained of severe pain in the forehead and loins—but oftenest in the former—and sometimes extending down the legs. The eyes were suffused, glazed, injected; the skin was warm and dry; the tongue moist, furred, white, and red at the tip and edges; the bowels bound; urine scanty, straw-coloured, sometimes dark brown, albuminous and frothy, in some patients; and in one so much so as to remain in bubbles for hours. In this case, and in another, it was exceedingly dark brown and tinged with saffron. So dark was this colour, in one case, as to stain all unpainted wood on which it fell. Ordinarily no nausea existed, but in bad cases the stomach was irritable at an early period, and then vomiting, first of the ordinary contents of the stomach, occurred; afterwards there was sometimes a

greenish or brownish fluid ejected, and in fatal cases, at last, the peculiar coffee ground liquid more or less distinct. The most perfect specimen of the latter was from a merchant seaman, the granules being very distinct, dark, regular in size, and floating in a transparent fluid, so that when scattered over the floor they seemed to have come from the washings of a coffee-pot. In some cases the tongue, on the second or third day, became thickly loaded with white fur, sometimes tinged yellow; and in the severe cases this fur became dark and dry. In others the fur disappeared, and the tongue looked like raw flesh more or less dried. The alvine evacuations were usually of an olive hue and healthy appearance, but in fatal cases sometimes resembled the vomit. The mind at first also frequently became stupid; delirium and coma occurred in severe cases, and convulsions immediately preceding death happened in several. In one case raving mania began the attack. The pulse was uniformly frequent, ranging from 90 to 130, regular, full, and sometimes strong. But at the end of forty-eight hours it commonly sank, lost force, fulness, and frequency, and by the third day was down to 70, and often as low as 60 in the minute. In several cases it sank below 50, and in one instance down to 42.

The cases from merchant vessels were commonly from neglect in the first stage, much more severe and fatal, nearly all dying. In one case, that of Benedict Janson, from the Huntsville, the tonsils became so swelled as to threaten suffocation, and required repeated lancing and the application of lunar caustic. His body also became covered with a vesicular eruption. This patient was cured, and returned to the vessel, but a week or two afterwards got wet at sea, relapsed, and died. The same mishap occurred to Andrew McAvoy, another of her crew, who was admitted into the hospital with the fever on the 22d of August; discharged when well, Sept. 1st; eat a young cocoanut which induced colic, relapsed, and died at the hospital with the black vomit on the sixth. R. M. Parker, a young Philadelphian, who had long suffered in the St. Lawrence with diarrhœa, was seized with the fever of a very severe type, was sent to the hospital, and died on the fourth day of his admission, with the vomit and copious bloody stools. But the rarest case was that of George Dean, also a young man from the above ship. He had yellow fever of so low a form, that when it subsided he was cold, covered with a clammy sweat, and nearly pulseless. To produce reaction, rubefacients, sinapisms shifted from part to part, and stimulants, including the volatile julep, were used. Tonics were subsequently given, and in a short time he began to convalesce. But his eyes and all his skin became of a saffron hue, and continued so for weeks; the skin likewise became covered with a small papular eruption, and in every pimple, by the use of a microscope, a small vesicle filled with a watery fluid was discovered. After some days a few of the vesicles on his chest became about half the size of a common pea, and filled with a yellowish fluid. His urine was somewhat albuminous, as dark as French brandy, and so deeply

tinged with bile that it stained the floor a saffron hue. This patient grew well, but was thirty-eight days in the hospital. Another patient, a seaman, had urine of a light colour, and so albuminous that it remained in bubbles for a long time after discharged. Finally, a marine from the St. Lawrence, William Regan, and two merchant seamen, died in the hospital with profuse hemorrhage from the nose, mouth, and stomach.

Causes of the Fever.—Some persons of Key West ascribed the late epidemic to the Adventure, the brig which arrived there from Havana in the first week of last July. She, I heard, had two cases, one of which died at the marine hospital; but as the cases which occurred in the island, and other vessels did not appear until the latter end of the month, and as connection was discoverable between them and the cases in the Adventure, there is no good reason to believe that the fever originated from her. On the contrary, I believe it was generated on the island which has been afflicted with it from the time it was resorted to by Commodore Porter's squadron, about forty years ago. Though the disease rarely prevails among the natives or long residents, a lady who had resided there for ten years assured me she had never known a year to pass without some cases occurring, though the fever was rarely epidemic and had never been so much so as last year. Though Key West has been partly cleared of trees and bushes, and a number of hollows have been drained of stagnant water; yet I found twenty-two of these of various sizes, which, during the rainy season—the close of summer and the beginning of fall—were more or less filled with water, marsh-weeds, and aquatic plants. These hollows are contained in a circuit of two or three miles; some are within the southern part of the town and all between it and the south side of the island; nearly all its eastern half is level, and partly swampy, and overgrown with evergreens and bushy trees in watery places. The most of those near the town are covered with woody nightshades, some of which attain a height of eight or nine feet. At all times the southern and eastern shores are partly covered by dead sea-weeds and grass, and after strong winds the above plants, fresh and old, intermingled with dead zoophytes, are heaped up in putrefying masses, which attract the numerous buzzards hovering over the island. The high temperature of the air and frequent, copious showers cause the decomposition of these vegetable and animal substances. But the most abundant sources of malaria generating the fever are the hollows in the southwestern part of Key West, back of Fort Taylor, and the low ground, or rather flat conical rocks overgrown with weeds, extending northward from the largest pond called Lake Como to the hospital. Back of this, also, is a hollow, which last year was partly filled with fresh water and mud. This hollow may have been one of the sources of the fevers which originated among the inmates of the hospital. But I think it more probable that the malaria from the mud ponds and low grounds above mentioned were the chief causes both of the fevers in the hospital and among the labourers at Fort Taylor, as the first cases on the island occurred among them. I knew of two

children who lived near two of those ponds, having had the fever; and nearly all the cases which occurred among patients sent to the hospital for other complaints, were located in the lower and at the southern end of the hospital, when they were seized with the fever. Moreover, in that part no other cases of it were treated, and the Gem of the Seas, the San Jacinto, and Saint Lawrence, the first vessels infected, were anchored abreast of the low grounds, and so near to the adjacent ponds that the east and southeast wind which prevailed before and after the fever began, blew directly over the land and vessels, thereby wafting to them whatever malaria may have been accumulated over the ponds and low grounds.

Among the predisposing and exciting causes of the fever the principal, were the habitual use of alcoholic drinks; indigestible, irritating, and stimulating food; exposure to spray, currents of cool air; excessive labour; or scorbutic diathesis and depressing passions, especially fear of the disease. A combination of some of the above named causes sometimes happened. In two inebriates fear seemed to be the chief exciting cause, and in one very temperate person it was thought by some of his shipmates to be the sole cause of the attack. But he got well, and the two former died.

As prophylactics we recommend the avoidance of all the above mentioned causes, and particularly of fatigue, exposure to the sun when very hot, and intoxicating liquors. Though smoking tobacco has been recommended as a preventive of yellow fever, I have never had reason to think it such, and have, on the contrary, seen so many smokers affected with the disease that I believe that tobacco, either smoked or chewed, predisposes to an attack. Indeed, there appears to be a very great resemblance between the action of narcotic acrid poisons and the poison causing yellow fever, though the countenance of patients suffering from it is more like that of persons intoxicated with some kind of ardent spirits, the eyes of the patients at first being precisely like those of a man who has been engaged in a night debauch. In the last stage of fatal cases the eyes are of a dirty yellow colour, like those of confirmed sots. The poison of this fever, in other respects, is manifestly possessed of similar qualities to alcohol and some less stimulating narcotics. In the yellow fever the brain is as plainly affected as by any of them, as shown by the injected eyes, stupor, delirium, torpidity, prostration, and sometimes spasms. But the invariable pain in the forehead and redness of the eyes indicate that the anterior part of the brain and the thalami nervorum opticorum are chiefly affected. The irritation of the latter causing the optic nerves and bloodvessels to sympathize, and the eyes of the patients to be like those of persons who have just had a night debauch.

The frequent affection of the stomach, liver, and kidneys, seems to be merely incidental, and attributable to those organs being predisposed to inflammation from improper articles of drink and nourishment, or to these having been taken in excessive quantities. Exposure to great heat is likewise one of the exciting causes of liver affection.

TRANSACTIONS OF SOCIETIES.

ART. XI.—*Summary of the Proceedings of the Pathological Society of Philadelphia.*

1862. *April* 23. *Case of Embolism.*—DR. HUTCHINSON exhibited a common iliac artery, in which an embolus had become impacted, and read the following history of the case from which it was derived.

Mary Ann McGuire, aged 11 years, first came under my observation as a patient of the Dispensary of the Moyamensing House of Industry, where she was brought by her mother, who said that the child had been suffering with disease of the heart for some years. As is usual among patients who seek relief at public charities, a very imperfect history of the case only could be obtained. It did not, however, appear that she had ever had any disease in which organic changes of the heart's structure occur as a frequent complication.

The following was the result of a careful examination. A purring sensation was communicated to the hand applied over the precordial region, while percussion revealed the presence of hypertrophy, and auscultation a blowing murmur heard best at the apex and with the first sound.

The child continued to come at regular intervals to the dispensary, evidently improving under the treatment adopted.

March 4. I was requested to visit the child at her home, upon doing which, I found that a most remarkable change had taken place. The mother told me that on the evening preceding, the child had gone to bed in her usual health, but had been awakened at 10 o'clock by a violent pain in her right foot, which had continued almost uninterruptedly up to the time of my visit. Upon examining the foot and leg, I found the temperature of both to be very much below that of the other side, there being an abrupt transition from the normal heat of the thigh to its almost complete absence at about the level of the tuberosity of the tibia; also inability to raise the limb without assistance, and that the child complained of sharp shooting pains occurring in paroxysms, which were referred to the points of distribution of the nerves of the leg. I found, moreover, that there was increased sensibility, and that no pulsation of the dorsal artery of the foot, of the posterior tibial or popliteal arteries could be discovered. The position of the patient prevented me from satisfying myself in regard to the condition of the femoral.

I made the diagnosis obliteration of an artery, I thought the femoral, by an embolus; and I was induced to make the diagnosis by my knowledge of the previous history of the case, the suddenness of the seizure, the almost post-mortem coldness of the limb, the intense pain occurring in paroxysms, and the absence of pulsation in the popliteal artery.

The treatment consisted in the external application of warmth, and in the exhibition of general and local anodynes.

5*th*. No change presented itself to my notice this morning; the suffering during the night must have been intense, as the cries of the child were heard at a distance of half a square.

6*th*. During the night the child's sufferings were so great that the father sent for a physician in the neighbourhood, whom they afterwards determined to retain. Not wishing to lose sight of the case, I asked and obtained permission to see the child occasionally. The treatment adopted by my successor did not materially differ from mine, and like it, failed to afford any relief.

7*th*. There does not seem to be any effort made to establish the collateral circulation. Two grains of sulphate of morphia had been prescribed without affording relief, or inducing sleep.

13*th*. I carefully examined the foot to-day, and found that when I pinched a toe, the child was unable to say which had been touched; and that in regard to the rest of the foot there was entire inability to localize the point of contact. This absence of the sense of touch reached to the malleoli; above this point the application of any body produced pain.

16*th*. The whole foot has become a livid blue colour, there being every evidence of commencing gangrene. No heat and no sensation in the part, with great pain upon movement. Pressure made over the course of the femoral artery produces an instant scream from child; no such result following pressure upon other parts of same thigh, or upon corresponding part of other thigh. Pulse is now 132. Child very weak; appetite poor. The inhalation of a mixture of ether and chloroform was ordered, but failed to produce any benefit.

29*th*. The pain is still intense, and is still referred to foot, especially to big toe, although the whole foot is now in a condition of sphacelus.

April 7. The line of demarcation appears to be forming just below the knee. Child's general condition does not warrant the thought of an amputation being entertained.

15*th*. The case terminated fatally during the night of the 13th. Permission was, after some trouble, obtained, to make an autopsy.

The foot had become detached; the lower extremity of the other side was slightly œdematous; the abdomen somewhat distended. The body, considering the length of the illness, and the greatness of the suffering, not much emaciated.

The autopsy was made hurriedly, owing to the family being in a somewhat excited condition, and decidedly unwilling to allow a thorough examination to be made.

The heart was found to be dilated and hypertrophied, equalling a man's in size. The left auricle was very much distended, and contained a large grumous clot, evidently of old formation. In the corresponding ventricle was found a small one, recent in its origin. The orifice of the mitral valve was very much contracted, while the valves themselves were so thickened as to be evidently incapable of closing completely during the systole. The aorta was examined carefully from its origin to its bifurcation, but nothing abnormal was discovered. Just beyond the commencement of the right common iliac artery was discovered a clot occupying the entire calibre of the vessel and extending into the external iliac almost its entire length. It was not possible without destroying the specimen to discover the position at which the embolus had lodged; but as the external iliac was entirely patulous, it seemed to me that it must have been low down in the external iliac. None of the organs could be examined.

There can be very little doubt that the contracted orifice of the mitral valve caused a dilatation of the left auricle, with arrest of the blood which, ceasing to circulate as quickly as usual, coagulated. The clot thus formed underwent disintegration, and readily permitted a small portion to become detached, and to be carried into the general circulation. I was right, therefore, as to the nature of the lesion, but wrong in regard to the position of the clot, being misled by having perceived at various times a slight pulsation in the groin.

Nov. 26. *Case of Multiple Aneurism.*—Dr. W. F. NORRIS presented the following report of this case:—

Thomas Ridgeway, a mulatto, æt. 55, was admitted into the Pennsylvania Hospital 6th mo. 15th, 1862, presenting the following symptoms. On the right side of the body immediately behind and above the sternal end of the clavicle was a small pulsating tumour with a well-marked thrill and loud bruit, and in the axilla a larger tumour (about the size of a hen's egg), which also presented the usual characteristics of an aneurism. There was also a large aneurism in the popliteal space of the left side. His history is as follows: Seven months ago he first experienced pain and partial loss of power in the right arm, and one evening when rubbing it noticed the tumour. In the same way his attention was drawn to the popliteal aneurism, eight weeks previous to his admission. Up to this time he did hard work as fishmonger on the wharf, frequently lifting halibut and other heavy fish.

He has constant and severe pain in the thigh, leg and foot, and occasionally also in the arm and hand. The popliteal aneurism steadily increased, the pain becoming more and more intense until 8th mo. 5th, when the sac of the aneurism appeared to give way; the leg swelled enormously, and on the 10th the foot became gangrenous. Since his residence in the house another small aneurism has appeared just below the axillary one; it is about three-quarters of an inch in diameter. The gangrene continued to spread, finally reaching the knee. There were frequent small hemorrhages, caused apparently by the ulceration of superficial veins, which, however, always yielded *pro tempore* to pressure from dry lint and a bandage. The treatment consisted of a full diet, and the free administration of opiates and stimulants, notwithstanding which he rapidly sank, and died on the 21st.

An *autopsy*, seven hours after death, showed an enlarged, pale and softened heart; the arch of the aorta and all the arteries springing from it dilated considerably beyond the normal size, and their coats thickened; a small aneurism (about one and a half inches in diameter) in the right subclavian. In the course of the axillary artery was a large aneurism (about three inches in length) over which the nerves of the axillary plexus were spread out and to which they were attached. Immediately below this, in the brachial, was another small dilatation, about three-quarters of an inch in diameter.

No satisfactory dissection could be made of the popliteal aneurism on account of the advanced state of gangrene of the part.

1863. *Feb.* 18. *Chronic Arachnitis; Death from Effusion, etc.*—Dr. JOHN ASHHURST, Jr., read the following history of the case:—

Levi D. Kistler, of Co. H. 96th Pennsylvania Regiment, admitted to U. S. A. General Hospital, Chester, Pa., August 12, 1862, suffering from

diarrhœa and debility. He was thin, and soon became still more emaciated. This fact, and the peculiar hue of his complexion, gave rise to the suspicion that he might be affected with diabetes mellitus, but an examination of his urine answered this question in the negative. His mind occasionally wandered a little at night; but attention was not specially called to the condition of his brain until the afternoon of Sunday, August 31st, when he suddenly became violently delirious, so that it was necessary to place him in an isolated apartment, and to employ mechanical restraint to prevent him from injuring himself and those about him. This mental condition (with occasional semi-rational intervals) continued until his death, which occurred about midnight on the 29th—30th of September. The morning before the delirium began, numerous petechiæ were observed over the abdomen. These increased in number, and at the end were to be found also on the thorax and limbs. About ten days or two weeks before death the cornea of the right eye became opaque and staphylomatous without obvious cause, and the mouth was drawn to the right side. Death at the last occurred rather suddenly.

An *autopsy* was made twelve hours after death, with the following results: Rigor mortis well marked; petechiæ over several parts of the body, and the skin of the abdomen had already assumed the green hue of incipient decomposition.

Cranium.—The meningeal vessels much enlarged and engorged; large amount of subarachnoid effusion; lymph, not very recent, gave evidence of arachnitis, but no appearance of tubercle was detected. The brain substance presented red points, such as are supposed to be characteristic of concussion of the brain, and such as are frequently found in cases of acute alcoholic poisoning.

Thorax.—Lungs, posteriorly much engorged, the condition constituting almost hypostatic pneumonia. The lung substance, however, floated when thrown on water. The bronchial tubes filled with a frothy mucus. Old adhesions, slight, however, of the left pleura; the right entirely free. The heart small and rather pale; in the ventricles large fibrinous clots were found in proximity to the valves; the mitral valve slightly thickened; pericardium healthy.

Abdomen.—Liver slightly enlarged, and presenting an appearance approaching to that known as "nutmeg liver." Spleen lobulated; healthy. Kidneys somewhat pale. Mesenteric glands much enlarged, but of normal consistence.

The co-existence of petechiæ with fibrinous clots in the ventricles has been remarked in two cases reported by myself to the Society on previous occasions.

March 11. *Ovarian Dropsy. Fibrous Tumour of the Uterine Wall inclosed in a Bony Shell.*—DR. PACKARD exhibited a specimen of this character, and read the following history of the case from which it was derived:—

Mrs. M., æt. 55, was first seen by me in the fall of 1860. She had borne three children, one still-born and two living, and had a miscarriage 23 years before. She began to swell about 17 years since, chiefly on the left side.

I was called to see her by her physician, Dr. Keating, who desired that I should tap her for abdominal dropsy, which had become a source of great distress to her, from the immense weight of the liquid accumulated,

and the interference with her breathing. Her abdomen was very large, equally distended, the cutaneous veins not much swollen; the umbilicus was, as usual, very low down on the tumour. Her urine was small in amount, and of a dark slaty colour—I do not know that any analysis was made of it. She had no anasarca, nor any other sign of disease of the heart, lungs, liver, or kidneys.

On the 8th of November I tapped her; the first entry of the trocar was made in the median line, and as the liquid flowed away, it became apparent that there was a congeries of cysts, probably, of course, ovarian. Another puncture was made on the right side, and still another on the left; the liquid drawn off from this last puncture was thick, grumous, and reddish, being like that from the other points, except in the admixture of blood with it. The entire quantity of liquid drawn off amounted to about twelve gallons. She had no faintness of any consequence either during or after the operation, and continued to enjoy a tolerable degree of comfort for about 18 months. Her urine, however, remained scanty, and obliged her to use diuretics constantly.

On the 24th of August, 1862, Dr. Keating being absent in Europe, Mrs. M. sent for me, and told me that her discomfort from abdominal enlargement was again becoming intolerable. Her condition was very much the same as before. For various reasons, the operation of tapping was postponed from time to time until Oct. 21st, when it was performed. Again she went through it very well. Four punctures were made at different points, where the cysts seemed to be most prominent; a less quantity of liquid was drawn off than on the former occasion, and it was more generally mixed with blood. Her comfort was greatly increased by the tapping; she did very well for three days, and seemed in a fair way to be up again soon, when she suddenly sank and died.

At the *autopsy*, the whole abdomen was found filled with enormous cysts of ovarian origin. A very large quantity of bloody liquid still remained, and some cysts of comparatively small size were intact. The appearance was that of excessive hypertrophy of the ovaries, the cystic element also acquiring an undue predominance over the fibrous stroma. One of the large cysts contained a quantity of air.

The uterus was very much enlarged, its neck being especially developed; in its anterior wall was contained an interstitial tumour, about as large as a small lemon, having a bone-like shell with dense fibrous contents; another small fibrous tumour was situated close by. There was a polypus at the uterine orifice of the left Fallopian tube, and another, crest-like in shape, at the side of the cavity near the neck.

All the other viscera were healthy.

Spotted Fever.—DR. PACKARD gave the following account of a singular case of disease recently observed by him.

E. F., æt. 19, a young girl in comfortable circumstances, employed in a manufactory of postage-currency notes, retired to bed in her usual health at 11 P. M., Feb. 19th, 1863. Next morning, at 7, she complained of headache, chilliness, and pains in her back and limbs. A brother about 13 years of age being very ill, she was not much noticed until after his death, which took place about 2 P. M.

I saw her at about 3 P. M. She presented symptoms easily accounted for on the supposition that she had taken a heavy cold, aggravated by

the distress occasioned by the illness of her brother. I ordered an anodyne febrifuge mixture, a hot foot-bath, and warm drinks.

At 6 P. M. she was in much the same condition.

At 10 P. M. her pulse was 160, her tongue was white and furred, and her throat somewhat sore, although displaying no abnormal appearance. Her hands and arms, and her body, were pungently hot, while her legs and feet were cold. She lay in a semi-stupor, unless when asked a question. Active stimulation and support were ordered, and counter-irritants externally, with a mixture containing aq. camph. fℨij; liq. ammon. acet. fℨiij; and tr. veratr. vir. ♏lxxx; to be given in fℨss doses every two hours.

She was unconscious all night, and on the 21st, when Dr. J. F. Meigs saw her with me, at 8.45 A. M., she was evidently dying. Her pulse was gone, and her surface becoming cold. Dark bluish-purple spots of varying size, generally very small, were scattered over the face, arms, and body. The lower extremities were covered with irregular pale bluish patches and streaks, as if from bruises.

She died at 11 A. M., "after a hard struggle," as I was told.

Dr. Meigs and myself made an examination of the body 21 hours after death. Body frozen; well formed, not very fat, but sufficiently so. Head not examined.

Thorax.—Lungs perfectly healthy; some hypostatic congestion. Nothing abnormal about the heart; some firm clots and a good deal of fluid blood in both sets of cavities, the clots being in greater quantity on the right side than on the left. About fℨj of turbid serum was noticed in the pericardial sac.

Abdomen.—Liver healthy. Gall-bladder distended with green bile.

Stomach distended with gas and greenish-yellow liquid; its mucous surface normal. Peritoneal coat of stomach, as well as of small intestines, spotted here and there with purplish-blue maculæ.

The mesenteric glands were much enlarged, and those corresponding to the lower part of the ileum were injected. Peyer's patches were enlarged and thickened, and one or two of them, some distance from the ileo-colic junction, decidedly injected.

Both kidneys were intensely congested, but otherwise healthy.

The spleen and pancreas were normal.

Bladder empty.

Bursal Tumour producing Loss of Power of Forearm.—DR. AGNEW presented the specimen, and made the following remarks:—

The tumour was about the size of a hickory nut, and was situated at the bend of the left arm, on the inner side of the tendon of the biceps muscle. Patient a female. It had been growing slowly for two years, was elastic to the feel, and exquisitely sensitive. The power of the flexor muscles of the fingers and thumb, and the extensors of the forearm generally, was so much diminished as to render the limb comparatively useless. The tumour made but little show externally, being bound down by the deep fascia of the arm, and in flexion and extension of the arm appeared to follow the movements of the tendon of the biceps muscle. I regarded it as of bursal origin, and accounted for the muscular phenomena from either contiguity or attachment to the nerves inclosing the muscles involved.

In its removal an incision was made through the skin directly over the growth, the median basilic vein pushed aside, the laminæ of cellular tissue divided on a director, and the bicipital aponeurosis opened, when the tumour

came into view, when, on a careful inspection, it was found to have the median nerve investing its anterior surface spread over it in a membranous form, and likewise adherent. This was carefully dissected away, and, on turning out its deep surface, a similar, though not so extensive connection was found to exist with the posterior interosseous nerve. A single narrow prolongation alone retained the growth, which descended beneath the tendon of the biceps muscle to the bursa situated between it and the tubercle of the radius.

The history of its formation might doubtless be stated as follows: A few fibres supporting the bicipital bursal membrane had yielded under some strain, allowing the latter to bulge through, and to increase gradually in size by the accumulation of fluid. Subsequently, the tumour became solidified by inflammatory products becoming organized.

The tumour contained no fluid contents, but consisted of formation of fibrous or connective tissue in various stages of development. The recovery was most satisfactory, the lady having very soon regained the use of all the muscles implicated.

Case of supposed Typhus Fever, death occurring on the third day; Hypospadias.—Dr. ASHHURST reported the following case of this:—

W. W. Fenno, private, Co. K, 145th Regiment Pennsylvania Volunteers, entered the Germantown U. S. A. Hospital on December 14, 1862, suffering from chronic rheumatism with debility. After some weeks he was detailed for duty with Hospital Guard, and continued to serve with that body until within a few days of his death. On Tuesday, February 17th, 1863, he complained of slight diarrhœa, which had lasted for some days, and annoyed him. He appeared, however, as well as usual. The next day, Wednesday, he was found in bed with a high fever, flushed face, rapid pulse, quick breathing, and dry and darkly furred tongue. In the evening his condition was much the same. He denied having experienced any rigors, though a tremulousness in his voice and motions several times suggested the inquiry. The next day, Thursday, he was evidently suffering from, and apparently far advanced in, the course of a low nervous, congestive fever, which more resembled typhus than the enteric or typhoid. His dyspnœa was greatly increased. Auscultation showed great congestion of the lungs posteriorly, without, however, any positive inflammation. Great hebetude of mind, from which, however, he could be temporarily aroused by a question in a loud tone of voice, had replaced the nervous jactitation and excitability which existed the previous day. His belly was quite tympanitic, and the capillary circulation over the whole body very feeble. No "tache" or eruption of any kind could be found by the most careful examination. From this time he became steadily worse, each visit rendering more certain the unfavourable prognosis which had already been formed.

On Friday morning, the third day only since the first manifestation of the disease, he was evidently moribund. Hebetude was rapidly deepening into coma, congestion giving way to carnification, and retention and suppression of urine were added to complicate his condition. About 1.30 P. M. he was seized with an attack of vomiting, during which he discharged from the mouth a large round worm (*Ascaris lumbricoides*). Delirium and extreme restlessness alternated with his comatose condition, until his death, which took place about 4 P. M.

An *autopsy* was made nineteen hours after death, with the following results: Rigor mortis strongly marked; excessive lividity of the depending

portion of the body; over the epigastrium a group of petechiæ, which the nurse declared to have existed before death; no vibices whatever.

Thorax and abdomen only examined. Pleuræ on both sides entirely free from adhesions. Both lungs congested very much posteriorly, but crepitant throughout. Heart and pericardium healthy; the left ventricle filled with black fluid blood, the right ventricle containing two fibrinous clots. Liver rather large; healthy. Spleen very much enlarged and lobulated. Kidneys healthy. Intestines presented no glandular disease whatever.

The absence of organic lesions in this case may be attributed to the short duration of the disease, which seems to have struck principally at the nervous system.

This patient presented a well-marked case of hypospadias. The opening of the urethra was to the right of the raphé, and immediately below the frænum. A mere depression existed in the glans penis, at the usual point of opening of the urethra.

April 22. *Tumour.*—Dr. PACKARD exhibited a tumour about the size and shape of a lemon, removed by him from the upper and back part of the thigh of a robust man æt. 45. The patient had first begun to suffer from numbness and swelling of the left leg and foot about two years since. About sixteen months ago he discovered a small swelling just under the lower edge of the gluteus maximus, and this lump had continued to grow slowly and steadily. For about eight months previous to the operation he had been unable to remain in bed at all, the uneasiness caused by the pressure of the tumour on the sciatic nerve being so great as to compel him to resort to incessant change of posture. His general condition was good.

The operation was done on the 17th of April, in presence of Drs. Norris, Peace, J. Pancoast, W. H. Pancoast, and Boker. The patient being thoroughly etherized, an S-shaped incision was made, and the tumour readily enucleated after the lower fibres of the gluteus maximus had been carefully divided. Three small arteries required ligation. The tumour, which consisted of fully developed fibrous tissue, seemed to have no decided attachment to any of the adjacent structures. Iron-wire sutures were used to close the wound. All the symptoms due to pressure on the sciatic nerve disappeared at once, and the healing of the wound took place as favourably as could be desired.

(*May* 9. This patient may be considered as absolutely well, although his leg has not yet fully recovered its strength, and swells, probably from relaxation of its vessels, after he has walked any distance, or stood up for a length of time.)

Ovarian Cyst; Atrophy of the Uterus.—Dr. PACKARD exhibited this specimen, removed by him *post-mortem*, from a patient of Dr. J. C. Morris.

The patient, Mrs. K., æt. 68, had had an enlargement of one side for many years. About two years since she was a good deal troubled with pain, which she thought to be colic. On Dr. M.'s seeing her in December last, the umbilicus was depressed, and fluctuation was perceptible, although not very marked, on the right side of the abdomen. Simpson's sound seemed to pass about 5 inches (!) into the cavity of the uterus. The diagnosis made out was of ovarian dropsy, and the treatment adopted was simply palliative.

On account of the extreme embarrassment of respiration, tapping was performed March 11th, nine pints of very fetid, ropy, sanguinolent pus

being drawn off; the tumour was not, however, reduced more than one-half.

She gradually swelled again until about a week before her death, her general health declining. On the 12th of April an abscess broke about two inches from the point where the tapping had been done, discharging a very large quantity of yellowish ropy fluid, of a most sickening odour.

She died exhausted, April 15th.

The *autopsy* was made on the 16th. On opening the abdomen, a very large thick-walled cyst, deep bluish externally and nearly black on its inner surface, filled with a thick puruloid liquid, of most nauseous odour, was found adhering to the anterior wall. This had contracted adhesions to the omentum and intestines, and had drawn up the uterus so as to bring this organ and the vagina into a straight line. One of the Fallopian tubes, the left, had upon it, near the uterus, a dilatation; it was this tube which was connected with the diseased ovary in which the large cyst above mentioned had its origin, and which, being drawn up into a straight line with the uterus and vagina, admitted the uterine probe so as to simulate enlargement of the uterus. The latter organ was extremely soft, and the substance of its walls very much less in quantity than in the normal condition. The other ovary was also affected with cystiform disease.

The heart was excessively fatty—the liver somewhat so. The other organs presented nothing abnormal.

Spotted Fever.—Dr. PACKARD mentioned that since the last meeting of the Society he had had an opportunity of examining *post-mortem* two additional cases of the peculiar epidemic lately observed here.

One of these cases occurred in the practice of Dr. John F. Lamb, of Frankford. It was that of a girl æt. 20, a farmer's daughter, who had been in good health until April 8th, when she sickened; on the 12th she died. The autopsy was made 63 hours afterwards, in presence of Dr. Lamb and Dr. Wilson Jewell; the notes of it are as follows:—

"Body frozen; it had been in ice. No rigor mortis remaining. General appearance normal; petechial spots in very small number on the front of the chest and abdomen, and on the shins in the shape of ecchymoses.

"The *head* was first examined.

"The brain and its membranes were intensely congested throughout; the brain was softened, excepting the pons varolii. An effusion of yellow serum or lymph was noticed beneath the arachnoid, between the convolutions of the brain; this existed in the spinal canal also.

"On the *abdomen* being opened, the viscera looked healthy. Some of the mesenteric glands were slightly swollen, and a few of them were congested. The mucous membrane of the stomach was at some portions very deeply injected, and here and there it was destroyed over patches of small extent. The organ contained a dark, semi-fluid, coffee-ground material, with a great many particles like broken-down blood-clot in it.

"Some of the glands of Peyer were decidedly, although not deeply congested. Those close to the ileo-colic junction were normal, the affection existing in those higher up

"The kidneys were markedly congested. Spleen pulp softer than usual.

"Liver congested and softened.

"The *thoracic* viscera presented no evidence of disease; the heart was firmly contracted upon a mass of softish currant-jelly-like clot, with a few

decolorized portions here and there. Lungs perfectly healthy; some hypostatic congestion in each."

The other case occurred in Manayunk, in the practice of Dr. J. K. Uhler. It was that of a young woman, æt. 27, who was examined by Dr. Morton and myself 72 hours after death.

The appearances were much the same as in the other cases mentioned—intense venous congestion of the brain and its membranes; congestion to a less degree of the kidneys, and to a still slighter degree of the other abdominal viscera. A noticeable feature of this case was the presence of purpureous spots on all the serous membranes, the pleuræ, pericardium, and peritoneum. It was thought by some of the gentlemen present that the clot contained in the heart was less in quantity and softer than normal.

In none of these cases, therefore, was there any special lesion to be detected in any organ. The evidence afforded so far, therefore, by post-mortem examination has been simply negative, and sheds no light on the nature of the disease.

June 10. *Case of Osteo-myelitis, with Phlebitis and Metastatic Abscess following Secondary Amputation.*—Dr. JAMES A. DRAPER related the following case, under his care, at the Chester Military Hospital, of gun-shot fracture of the left humerus, received in one of the battles of the summer campaign of 1862, a portion of the ball remaining imbedded in the bone. Union had occurred, with the formation of a large ensheathing callus, but rapid ulceration of the soft parts having subsequently set in, and there being evidence of extensive necrosis, the patient at the same time failing in strength, amputation was determined on, and accordingly performed by Dr. Draper on February 16, 1863.

After two days, rigors set in, and the patient became gradually worse until he died on the morning of the 25th. The following are Dr. Draper's accounts of the dissection of the amputated arm, and of the autopsy made subsequently to the patient's decease.

Dissection of the amputated portion of the arm showed that a large amount of callus had been thrown out, uniting the fractured ends of the bone. Running diagonally from before backwards and from above downwards through this mass of callus and newly-formed bone, was a large splinter of detached bone about three inches in length. On the posterior part of the humerus, corresponding with a large opening on the posterior aspect of the arm, about half the ball was found imbedded in the bone.

Autopsy.—The stump and shoulder were slightly infiltrated, and the superficial veins marked by prominent purple lines. The cephalic vein was very much inflamed, and at about two inches from the cut extremity contained a small quantity of pus; the axillary vein was inflamed, but contained no pus. The periosteum was detached, and at numerous points small quantities of pus were found between it and the bone, rendering it easy to strip it off up to the tuberosity. The medulla protruded nearly an inch from the end of the bone, while the medullary canal contained a large quantity of sanio-purulent matter. The synovial cavity of the shoulder-joint was filled with pus, and the *right* lung infiltrated with the same, though no abscesses were formed; the *left* pleural cavity contained about 1½ pints of sero-purulent matter, while the lung on this side was comparatively healthy. The pelvis of the right kidney contained pus and oil-globules; left kidney pale and flabby. The liver was very much enlarged and softened; the spleen softened, but not otherwise changed.

Great Sciatic Nerve hanging from the stump of a child, the limb having been torn off by the revolution of a carriage wheel.—Dr. JOHN ASHHURST, JR., exhibited a specimen, and read the following history:—

E. R., aged nine years, about 4½ P. M., on the afternoon of May 20, 1863, was playing in the main street of Germantown, and catching upon the rear of a passing carriage his right leg became engaged between the spokes of the wheel, and his limb was torn off by the strain thus brought to bear upon its structure. The accident occurred a short distance above the Military Hospital, and as I was almost immediately summoned to the scene, it could have been but a very short time after the event that my personal observation of the case began.

The child had fainted, when I saw him, from the commingled effects of shock and hemorrhage; the latter had probably at first been very profuse, as the clothes of the patient were saturated with blood, but at this time had entirely ceased. As a measure of precaution, however, a Spanish windlass was extemporized from my pocket-handkerchief, which was afterwards replaced by an ordinary tourniquet. The thigh was entirely severed; the bone being broken off about the middle third, while the muscles were torn from their sheaths, and the skin cut as if with a knife about three inches higher up. The great sciatic nerve was found hanging about fifteen inches from the wound, having given way below its division in the popliteal space. The vessels were retracted, so as to be entirely out of sight; with the exception of a little blood which drained from the muscles below the point of application of the tourniquet, not a drachm of blood was lost from the moment I first saw the case. For a short time, under the free use of stimulus, the pulse improved and the patient rallied, becoming warmer and regaining entire consciousness. Secondary shock, however, came on before long, and from that time the failure of vital power, though slow and with occasional fluctuations, was in the main steady; and life became finally extinct about 5 A. M. of the 21st, rather more than twelve hours after the receipt of the injury.

One of the most interesting features in this case was the rapid cooling of the body after the accident, and the prolongation of this coolness, with very slight variation, for twelve hours, up to the time of death. In Dr. Richardson's very interesting paper "On Cooling of the Body after Death," in the January number of the *Medical Critic and Psychological Journal*, it is observed that in deaths from loss of blood, profuse exudation as in cholera, or obstructed circulation as in cases of embolus in large vessels, the body will cool to the temperature of the surrounding medium in two hours after death, and may do so before life is extinct. The presence of this boy's mother and friends prevented me from ascertaining the temperature of the skin by a thermometer, or I have no doubt I could have verified these results.

An interesting question is also suggested by this case, theoretical in the particular instance (for it was evident that death would ensue under any circumstances), but which in similar cases might be not only practical but of vital importance, viz., whether it would be better to resort to amputation at once, without waiting for perfect reaction, or to postpone operative interference until reaction, if it occurs at all, is established. That the statistics of the latter course should be more favourable, is only what we should expect; for the cases would by the act of waiting be selected. But I have sometimes doubted whether by delaying, surgeons did not consult rather their own reputation as successful operators, than the simple good of

the patient. A large and terribly lacerated and contused wound, with great nerves and bloodvessels implicated, is, I suspect, often a more seriously depressing agent than would be a rapid and skilfully performed amputation with or without the induction of anæsthesia.

Another point of some interest in a physiological point of view is, that although pain was experienced on the flap of skin and fascia being touched, there was no particular suffering felt when the sciatic nerve was handled

June 24. *Pericarditis with Effusion, completely adherent Pleura.*—Dr. JOHN ASHHURST, Jr., read the following account of the case:—

Samuel P., a sailor, aged 34, was admitted to the Pennsylvania Hospital, in April, 1862, suffering from great dyspnœa, which was supposed to be due to diffuse tuberculosis, from the general appearance, and especially the cyanosed complexion of the patient, although the physical signs of phthisis were more observed. There was evidently effusion on the left side, as shown by dulness on percussion, absence of the respiratory murmur, and of vocal fremitus and resonance. The sounds of the heart were very feeble, but no abnormal bruits were heard.

Under an alterative and diuretic treatment the patient slightly improved, but after a time, although the lung sounds had to some extent cleared up, he began to sink, and died on the 11th of July, 1862.

For some time before death the lower extremities had become œdematous.

An autopsy was made eight and a half hours after death, with the following results:—

Thorax.—On the right side the lung was healthy, and with no pleuritic adhesions. The left lung was completely adherent to the parietes, the pleural cavity being obliterated and the lung itself compressed and completely carnified by the pressure of the distended pericardium.

The pericardial sac was very much enlarged, and contained about twelve fluidounces of liquid. The pericardium adhered to the lung. Both surfaces of the sac were roughened with old effusions of lymph which gave the heart the appearance sometimes spoken of as the "beef's tongue" heart.

The heart itself appeared healthy, no valvular disease being observed.

Abdomen.—The peritoneal cavity contained about a quart of liquid; the left kidney was slightly pale; all the other organs appeared healthy.

No tubercle was detected in any part.

This case had been frequently and carefully examined by several accurate diagnosticians, but so far as I know the condition of the pericardium was not even suspected.

I may mention in connection with this case, one which occurred in the autumn of 1862, in the Military Hospital at Chester, Pa., in the ward of one of my colleagues. This was treated and considered as a case of typhoid fever, with hypostatic pneumonia; after death it was found to have been acute tuberculosis of both lungs.

REVIEWS.

ART. XII.—*A Treatise on Hygiene, with Special Reference to the Military Service.* By WILLIAM A. HAMMOND, M. D., Surgeon-General U. S. Army; Member of the American Philosophical Society; Honorary Corresponding Member of the British Medical Association, &c. &c. Philadelphia: J. B. Lippincott & Co., 1863. 8vo. pp. 504.

ALMOST a century ago, the President of the Royal Society, Sir John Pringle, presented to Captain Cook a medal, with a public address, in honour of his account of the method by which he had preserved the health of his ship's crew, in a voyage around the world. And, still earlier, 1757, Dr. Lind published a work "On the most effectual means of preserving the health of seamen in the Royal Navy," in which he discussed with judgment the topics of foul air, diet, scurvy, ventilation, exercise, cleanliness, &c. Yet, notwithstanding the appreciation thus shown of many primary facts of sanitary science, concerning the army and navy as well as the public at large, it was reserved for the occurrences of a late European war, now familiar to all, to *prove* that bad hygiene is as fatal to an army as bad strategy; just as, in civil life, great epidemics have been required to compel apprehension of the value of local cleanliness, before appreciated only in theory. The present American war has extended a similar lesson; without the same, or nearly the same painful disasters to render it impressive; but rather, in most instances—thanks to the Sanitary Commission and the Medical Department of the Army—illustrating the soundness of the principles of preventive hygiene, by their successful application. If anything could be named as in any degree compensating for the evils of an immense war, such practical advancement in a science directly bearing upon the highest material interests of mankind, might be so considered. No one has had a better opportunity of observing, and no one could have more zealously devoted himself to applying all that can be known at the present time of military hygiene, than Surgeon-General Hammond; and few have been so well prepared for such duty by previous scientific training. It is not therefore from undervaluation of what he has contributed in the work before us upon the general subject of hygiene, that we are impelled to venture the opinion, that it might have been still more creditable, if not more useful to the profession and the public, if he had made it a treatise expressly and exclusively upon military hygiene; reserving for another volume the consideration of the general principles of the science of health. His reason for not doing so, however, is given in a very elegantly written preface; being a conviction that an imperative necessity existed for a treatise upon the principal subjects of hygiene. We may quote some of his words upon this point; especially as they indicate, in a certain sense, his *platform* as a thinker and author:—

"The most intelligent members of the medical profession recognize the principle that their efforts should be directed more especially to the prevention of disease than to its cure; and the people, who are rarely slow to comprehend matters which it is to their advantage to know, are beginning to appreciate the same fact.

"But while I do not wish to be understood as at all doubting the efficacy of proper medication in the treatment of disease, I am sure that the curative influences of hygienic measures have been too much neglected, and that drugs, the traditional actions of which have been positively disproved by physiological and chemical researches, as well as by the soundest deductions from pathology, are too frequently administered through a strict adherence to the routine which hinders the development of medical science, and cramps the powers of those who labour for its advancement."

While these sentences announce their author in the character rather of sanitarian than of physician, it is at the same time graceful for him to recognize, as he does, the intelligence, and to respect the practical experience, of the medical profession. Nothing less, in fact, would have been becoming to one who represents that profession in a high and important public office. It may be added, that the instances in which scientific research has, by cogent evidence, brought into question the "traditional actions" of officinal drugs, are exceptional; and, bearing in mind on the one hand the judgment of Lehmann, that physiological chemistry has not yet reached such a status as to enable it to afford *guidance* to therapeutics, we must, on the other, and for the same reasons, doubt its authority for *elimination;* and must hold that clinical medicine is, as well as physiological and chemical science, entitled to its own evidence and its own jurisdiction.

Surgeon-General Hammond's introduction conveys, in strong language and with striking illustrations, an idea of the immense advantage already realized by the application of hygienic principles to the care of armies. Sir John Hall, inspector-general of hospitals, stated before the British commission of inquiry, that, at the beginning of the Crimean war, he made, on one occasion, a requisition for a building, used as a stable for mules, to be turned over to him as a hospital for sick and wounded soldiers. After considerable correspondence and delay, "the mules carried the day!" A table quoted by Dr. Hammond from the returns of the director-general shows how great an improvement soon followed upon sanitary reform, which was extended throughout the British army. Thus, from 1830 to 1836, the annual deaths per 1000 men among all the troops, were 14; from 1859 to 1860, 5. At Gibraltar, from 1837 to 1856, 22; 1859 to 1861, 9. In Jamaica, the corresponding figures were, 128 and 17. Allusion is also made to the success of preventive measures on notable occasions during the rebellion in this country; the most remarkable of which was that of General Butler's administration at New Orleans; in which a summer passed without a single case of yellow fever, although the city was occupied by large numbers of Northern troops.

Dr. Hammond's work is divided into three sections: Section I. is on the Examination of Recruits. Section II. of the Agents Inherent in the Organism which affect the Hygienic Condition of Man. Section III. of Agents External to the Organism which act upon the Health of Man.

The first section opens with a statement of the indispensable importance of careful selection of recruits for the army, and of the frequent injury done in the army of the United States by its neglect. Thousands of totally unfit men, at the beginning of the war, were enlisted, to fill the hospitals or soon to be discharged. In one hospital of a hundred beds, Dr. Hammond discovered, at one time, fifty-two cases of hernia alone. In several regiments, the farce of inspection was performed by the surgeon walking down the line and looking at the men as they stood in the ranks. It is added, however, that "matters are better arranged now than at the commencement of the rebellion."

The limits of age for recruits, according to the United States army regulations, are eighteen and thirty-five years. In France and Prussia, twenty is the minimum; in Austria, nineteen; in Great Britain, with certain exceptions, eighteen. Napoleon's *dictum* upon the uselessness of boys in an army is sustained by our author, as it is also by Lévy, Ballingall, Kirckhoff, Coche, and others, and by the statistics of Quetelet. Dr. Hammond considers eighteen too low a minimum; adopting the view of Liharzik, of Vienna, that the human body does not complete its growth before the end of the twenty-fifth year.

"Physiologically, there can be no doubt upon the subject. The youth of eighteen years is immature; his bones are slender and deficient in the necessary amount of earthy matter to give them the proper hardness; the epiphyses are not yet incorporated with the shafts of the long bones, and, in the ribs, are still cartilaginous; the joints are undeveloped, not having yet expanded sufficiently to give firmness and strength to the limbs; the muscles are soft, and have by no means acquired their full power, as is shown by the investigations of Quetelet and others; the chest has not attained its full capacity, and the contained organs have not yet reached the maximum point of efficiency. In the digestive organs we find ample evidence of deficient power; substances which a mature man will digest with ease, cause cholera morbus, diarrhœa, or dysentery in the recruit whose organization is not perfected."

Dr. Hammond would place the minimum at twenty, or even twenty-two years. The maximum, thirty-five years, he considers sufficiently high. In stature, American soldiers are above those of Europe. In France the standard is less than 5 feet 1½ inch. In Austria, 5 feet. In the United States, 5 feet 3 inches. In Great Britain only is it higher, 5 feet 5 inches. Our author would allow the minimum to be as low even as 5 feet; below that, the development of chest and muscles is apt to be too slight for army life. Of eighteen hundred men, enlisted from eighteen States, U. S., one hundred from each State, two hundred and forty-one were six feet and over in height; while in the British army out of one thousand there were but sixty-five of six feet and over, and in the French army but four. Very tall men are objected to by Dr. Hammond, unless they have, as is not usually the case, a development of the chest and muscular system proportionate to their height. They are commonly wanting in robustness and respiratory capacity, and are more subject to hernia than others, besides being better marks for the enemy. The maximum proposed is six feet three inches. As Dr. Aitken has shown, however (quoted by Dr. Hammond), height must always be considered with reference to age. At eighteen, the height should be as near as possible to five feet four inches.

No point of physical conformation is held to be of more importance than capacity of chest. Dr. Hammond is of the opinion that no recruit should be accepted in whom the circumference of the chest immediately over the nipples measures less than half his height. Formulæ and tables are also cited from Hutchinson and Brent, in regard to the proportion of the circumference of the chest to height and weight. Brent found that the circumference of the throax, over the nipples, is twice the breadth of the shoulders. Four times the distance between the nipples is equal to the circumference; and the distance between the nipples is, in a normal chest, equal to the antero-posterior diameter. Dr. Hammond has taken pains to examine into the accuracy of these measurements, and confirms them. Symmetry of the chest is also important. Very young soldiers often have the chest flattened by constant stooping during the march, to afford purchase for the knapsack and other articles of equipment. For exact measurement of shape as well as size and extent of movement, several instruments are described. The

hæmadynamometer is recommended as especially convenient for estimating inspiratory and expiratory power. It may be remarked, by the way, that, as Dr. Hammond's book is not exclusively intended for medical readers, it might have been well to explain, as he does not, that this instrument and the cardiometer were originally designed for other uses. A description, too, with the engraving, of Scott's stetho-goniometer (p. 40) would have made it more available.

Dr. Hammond believes himself to have been, so far, alone in this country in the employment of the hæmadynamometer for any purpose. He states that the height to which a healthy man, five feet eight inches high, can raise the column of mercury, is, by expiration, about three inches; by inspiration, about two inches. The inspiratory power is, however, the most regular and suitable for comparison. With Hutchinson, Dr. Hammond found it to decrease, from five feet eight inches, both with increase and decrease of stature.

Weight is considered, properly, only in connection with age. Quetelet states that a man does not attain his maximum weight till he is about forty years of age; a woman, not till about fifty; both lose, normally, after those periods. A man at twenty should not weigh less than one hundred and twenty-five pounds. From eighteen to thirty-five the weight gradually increases; and it gains as the *height* progresses, at the rate of at least five pounds for each inch above five feet five inches.

Chapter II., upon the Special Qualifications and Disqualifications of Recruits, is brief but clear, adopting and following, to a certain extent, the views of Boudin.

The second Section commences with an interesting chapter upon the Hygienic Relations of Race. Dr. Hammond declares his belief in the diversity of origin of the several races of men, and adopts the theory of Agassiz, to our view, one of the least tenable of the many hypotheses suggested in opposition to the theory of Linnæus, Cuvier, and Humboldt. The present aspect of biological science appears to us especially unfavourable to Agassiz's theory; since the investigations of E. Forbes and C. Darwin, even to the minds of those who do not accept all the conclusions of the latter, have seemed to turn over a new leaf in this department of zoological derivation and distribution. We incline to go farther, and to designate the speculations of the diversitarian ethnologists as an almost closed chapter. This subject, although not immediately hygienic, is yet directly related to hygiene, in connection especially with acclimatization. Our author has done well, therefore, in introducing it into his book; and we may be allowed a few words of discussion upon it here. The terms in which the doctrine is stated (pp. 64, 65) place it in obvious contradiction to some familiar facts, a contradiction which it requires the boldest hypothetical reasoning to surmount. According to the theory in question, the earth's surface affords a number of centres of creation, floral, faunal, and human; each race of men, as of animals, is "peculiar to the region in which it dwells;" and there are of such human races sixteen in all. Let us select, then, two continents, the most important in modern history. In our author's language, they are designated thus as realms: "The *European*, inhabited by *white men;* the *American*, inhabited by *American Indians.*" Now, was Europe the "centre of creation" of its present white inhabitants? What says philology? What, history? If room exist for doubt there, let us revert to our own continent. In what sense can America, at this moment, be said to be "inhabited" by Indians, who form of its population the least important part? If migration be admitted, as it must be, as a characteristic of the predomi-

nant races, then, as a *fact*, the adaptative distribution of man into realms cannot stand. As an hypothesis in regard to remote time, whose proof, historically, is archaic and therefore unattainable, it could only claim probability, by analogy, if the general theory of Agassiz in regard to zoological distribution were established, which it is not, and does not now seem likely to be.[1] If we examine the views of Dr. Hammond in regard to the characteristics of distinct races, we find, in a later chapter (on Acclimation, pp. 294, 295), that he regards the colour of the skin and the character of the hair as *non-essential;* a very important but well sustained admission. What, then, are *typical* peculiarities? Of the most strongly marked race, the negro, they are said to be (p. 294), "the lengthening of the arms, the flattening of the calcaneo-tarsal arch, the backward prolongation of the os calcis, the curvature of the tibia, &c." These are definitely called "typical characteristics of the races in which they are found;" and so are "the form of the cranium, the shape and size of the features, and the mental organization." As to the bones of the extremities, they are so obviously under the influence of the development and action of the muscles, and the muscular system is so especially subject to variation under difference of use, that what might be called *race-habits*, acting through long periods of time, may account for all such modifications more readily than climatic conditions do for changes of colour and hair.

The long expanded chests of some inhabitants of high mountains or table-lands are at least equally remarkable; and more so are the facts that, in the hog, the number of caudal, sacral, lumbar, and dorsal vertebræ vary,[2] and that the wild hog has twice the number of incisors of the tame, while Filippi reports[3] the existence of a race of cattle in Piacentino which have fourteen pairs of ribs instead of thirteen. As to length of arm, Jarrold has shown that the forearm of the Scot is the medium between that of the negro and the Englishman.[4] Blumenbach found a native of one of the Marquesas Islands to agree exactly in his proportions with the Apollo Belvidere; and Owen tells us that one of the most perfectly formed skeletons he ever saw was that of an Australian!

Retzius and others have made the most of cranial differences. Yet, while Morton, the great authority upon "Crania Americana," asserted all American Indians to be of one stock, Retzius declares that "there is scarcely any part of the world where such contrasts are to be found between dolichocephali and brachycephali as in America." Weber, Wilson, Huxley, and J. A. Meigs all agree that "no cranial form is typical,"—"cranial measurements alone afford no safe indication of race."

Dr. Hammond asserts the very great improvement of nations by inter-

[1] As an exemplification of the difficulties in the way of this theory of Agassiz, we quote the following from Darwin: "Dr. Hooker has shown that between forty and fifty of the flowering plants of Tierra Del Fuego are common to Europe. On the highest mountains of Brazil, European genera were found by Gardner which do not exist in the wide intervening hot countries. At the Cape of Good Hope a very few European species were found, believed not to have been introduced by man, and not discovered in the intertropical parts of Africa. A list of the genera collected on the loftier peaks of Java raises a picture of a collection made on a hill in Europe! Dana remarks, that 'it is certainly a wonderful fact that New Zealand should have a closer resemblance in its crustacea to Great Britain, its antipode, than to any other part of the world.' Dr. Hooker informs us that twenty-five species of algæ are common to New Zealand and to Europe, but have not been found in the intermediate tropical seas."—*Origin of Species*, Am. ed., p. 326.

[2] Brace, Races of the Old World, p. 455.

[3] Quatrefages, Unité de l'Espèce Humaine. Paris, 1861.

[4] Brace, op. citat., p. 467.

mixture of blood with others of the same race; but denies the possibility of such improvement between different races. Passing over the abstruse ethnological question of the identity or diversity of the Huns with the earlier European nationalities, to which our author alludes, materials are at hand for controversy, if space allowed it, in regard to the degeneracy of half-breeds, and the sterility of mulattoes. His assertion upon this last point, although frequently made, is not sustained by intelligent medical men with whom we have conversed, who have spent most of their lives in the South; more than this, statistics disprove it. Brace[1] cites a table, given by M. de la Sagra, of the white and mulatto population of Cuba, from 1774 to 1841, showing that, in sixty-seven years, the mulattoes, male and female, increased in number more rapidly than the whites. Humboldt found that in Mexico the mulattoes were longer lived than the native Indians or Europeans. The Pitcairn Islanders demonstrated that the Teutonic and Polynesian races can unite without loss of fertility. The Canadian half-breeds are described by Prof. Wilson[2] as a race superior either to the pure Indians or the French of Lower Canada. This excellent authority alleges that "the intermixture of red and white blood does not lead to degeneracy, sterility, or extinction, but has created an extensive population of half-bloods." Other examples might be found, in the works of Prichard and others, to the same effect.

Apart from this question, however, Dr. Hammond gives some interesting and valuable information in regard to the marked characters of the three races which together inhabit this continent—the European, the Indian, and the Negro. The European has the greatest amount of physical as well as intellectual force, the greatest capability of resisting morbific agencies, and the highest capacity of adaptation to new climates. The American Indian is more prone to affections of the respiratory organs than the white man in the same regions. Cholera and variola are especially fatal to him; delirium tremens is said never to occur in this race, and idiocy and insanity less frequently than among Europeans. The negro, in this country, has never yet had an opportunity of normal development; the proper experiment of his civilization must be, as Dr. Hammond remarks, carried out on the continent of Africa. Negroes in temperate climates are extremely liable to phthisis and other scrofulous affections. At Gibraltar, in the British army, 43 blacks in 1000 died annually from consumption, against 5.3 whites; at Sierra Leone the proportion was about the same of both. The immunity of negroes against malarial diseases is proverbial. It is asserted by our author, and confirmed by Livingstone, that they recover much more readily than whites from syphilis. They are more subject to tetanus, but less so to other nervous diseases than Europeans. Surgeon-General Hammond's opinion that they could be made available in army service only as cooks, nurses, and teamsters, received modification under the influence of recent events, as his work was going through the press: it being said in his preface that it is "no longer a subject of doubt that they are adaptable for all the purposes of war."

Alluding to Boudin's statement of numerous accounts of travellers of the Aïssaoua of northern Africa being insusceptible of poisoning by the bites of venomous serpents, our author gives it as the result of his own observations, that the North American Indians can receive the venom of the rattlesnake into their blood "without being subject to the morbid phenomena to which the whites are liable from a like injury."

[1] Races of the Old World, etc., p. 483.
[2] Pre-Historic Man, vol. ii. pp. 348, 390.

Chapters II. and III. of the same section treat of Temperaments. Dr. Hammond admits four: the sanguineous, lymphatic or phlegmatic, choleric, and nervous. There is no doubt of the propriety of such a classification, except that no term yet devised for the third of this series appears appropriate. The essential characteristics of what is commonly called the bilious or choleric temperament appear to be, firmness of organization with moderate activity and great endurance; the external signs of which are, dark complexion and hair, rather hard skin, firm flesh, without adiposity, pulse strong, form square. We cannot ascertain the evidence upon which these traits are associated with hepatic susceptibility or peculiarity of any kind. Rather too much appears to us, also, to be asserted upon the influence of temperament on mental and moral character; as thus, of the sanguine temperament:—

"Inconstancy is the predominating influence. Good resolutions are formed but to be broken; friendships are contracted to be soon abandoned for others, which in their turn are soon given up. In love, the individual of sanguine temperament is fickle and faithless, and cares less for his honour than his pleasure."

Although Marc Antony, *perhaps* Plato, Charles II., of England, Lorenzo di Medici, Murat, Mad Anthony Wayne, and Shakspeare's Mercutio (the examples given by our author) may meet the mental as well as material requirements of this portrait, all of us must know examples to the contrary, in private as well as in public life. We should be sorry to distrust all our friends who have a florid complexion, red hair, blue eyes, small hands and feet, and good digestion. No doubt, however, it is but a general *proclivity of organization* that the author means to assert; in which case, the graphic energy of his language must be our excuse for hypercriticism. Of the choleric temperament, his illustrations are, Alexander, Julius Cæsar, Brutus, Mahomet, Charles XII., the Czar Peter, Cromwell, Sixtus V., Cardinal Richelieu. Of the nervous, Voltaire, Frederick the Great, and John Randolph. The recollection of many professional men in this country, will supply, as a signal example, the late Doctor George B. McClellan.

Idiosyncrasy is next briefly considered, in a chapter of three pages. The influence of age and its tendencies then receives attention. Dr. Hammond divides human life into three periods—that of increase, that of maturity, and that of decay. The physiological characters and special proclivities of each are treated of. Our attention is arrested by some remarks of a somewhat speculative character upon the duration of life.

"If it were possible so to adjust the repair to the waste that neither would be in excess, there is no physiological reason why life, if protected against accident, should not continue indefinitely. But this is not, with our present knowledge, possible, and consequently decomposition eventually becomes predominant, and death from old age results." (p. 93.)

"If we had a perfect knowledge of the laws of health, there would be no physiological reason why decay and death should take place except through accidental causes." (p. 106.)

"Through the neglect, then, of laws which we do understand, and from our ignorance of others which certainly exist, death, if not hastened by accident or disease, takes place surely by old age." (p. 107.)

Few hygieists or physiologists can, we fear, have so large a faith in the future possibilities of sanitary progress. Rather may we content ourselves with accepting the conclusion of Carpenter (also quoted by our author) that "the limitation of man's development, and the definite period of his duration, are ultimate facts; no event that we can discover intervenes be-

tween their production and the will of the Deity." Nor, we may add, will any precaution that we can devise be likely to intervene between the same will and the universal fulfilment of the law of mutation and mortality of all organized material forms.

In the interesting chapter upon Sex we notice a partial assent of the author to the opinion of Gall and Lévy, that there occurs in men a periodical manifestation analogous to the monthly period of females; affecting the secretions generally, and the nervous system.

Chapter VII., On Hereditary Tendency, is brief. Reference is made to the work of Dr. P. Lucas, as the best upon this subject. The influence upon the health of offspring of the consanguinity of parents is not mentioned.

Habit, generally considered, and Morbid Habits, occupy two chapters. Well expressed and interesting as these are, they do not seem to us to cover all the ground required in a general treatise on Hygiene, upon such topics. For example, to one whose reading upon the science of health might be restricted to this volume, it would be scarcely satisfactory to find, upon the subject of diarrhœa, three paragraphs, confined entirely to the statement of the frequent innocuousness of that disorder, with illustrations of the sometimes fatal result of arresting it. Of two paragraphs upon Constipation, the longer is devoted to instances of extraordinary periods of inaction of the bowels. Upon the subject of the generative organs, a more extended and very judicious discussion occurs, especially with reference to the military life. The comparative slighting of some subjects, above asserted, is to be very properly explained by the particular direction of the whole book, toward the purposes of military hygiene; but we find, in what appears to us a deficiency upon certain points, excuse at least, if not justification, for the opinion ventured at the beginning of this review, that the devotion of all his attention, in this volume, to army hygiene, might have made a work, on the whole, still more capable of advancing the distinguished reputation of its author.

Many readers will, however, we admit, hesitate to assent to this opinion, after perusal of the twenty-nine chapters of Sec. III. Three of these are engaged with the atmosphere; its normal composition, accidental or non-essential constituents, and physical properties. Besides a very well prepared account, showing wide research, of all the principal facts stated by other authors, Dr. Hammond gives the description and results of a number of original experiments and observations of his own in regard to the atmosphere and its relations to life. Thus (p. 153) he improved upon Bernard's experiment, following those of Regnault and Reiset, to test the influence upon vitality of a large amount of carbonic acid in the air, while no deficiency of oxygen exists. His result was confirmatory of the statement, that carbonic acid is free from direct or *positive* toxic effect upon animals.[1] He also repeated several times, with success, Herapath's experiments for the discovery of iodine in the atmosphere; as well as those of Dupuytren upon the poisonous action of sulphuretted hydrogen gas. In the latter case, more than $\frac{1}{1000}$th of the gas was found to be fatal in twenty or thirty minutes to sparrows and mice. In pure sulphuretted hydrogen, they died immediately, without convulsion; their blood after death being perfectly dissolved, the blood corpuscles completely broken down. Dr. Hammond's judgment is decidely expressed, that the "National Hotel Epidemic" at

[1] Dr. Herbert Barker, however, found prostration and diarrhœa to follow the inhalation of carbonic acid in small proportions. See Brit. and For. Med.-Chir. Review, Jan. 1859. Orfila and Seguin also report similar results.

Washington, D. C., which produced so much excitement some years ago, was due to emanations from a sewer, the chief agent in which was sulphuretted hydrogen. A stream of gas, strong enough to extinguish a lighted candle, was found flowing into the cellar of the house. The symptoms produced, also, were very similar to those observed by Dr. Taylor in the workmen of the Thames Tunnel.

Dr. Hammond proved by experiments upon rabbits that light carburetted hydrogen and olefiant gas, when pure, are not poisonous; the deleterious effect of the inhalation of illuminating gas being therefore due to the presence of carbonic oxide.

Ozone, also, has been with him a subject of careful observation and experiment. He found birds and mice to die in a few minutes, with symptoms of asphyxia, in an atmosphere containing not more than $\frac{1}{10000}$th of ozone. Small quantities of it invariably corrected the bad odour of putrescent vegetables and meat. At Fort Riley, Kansas, Dr. Hammond ascertained, by numerous observations, that a much greater proportion of ozone existed in a high locality, free from intermittent fever, than in one almost contiguous, bordering the river, in which the inhabitants were extremely subject to intermittents. On two occasions, during the prevalence of cholera at the same post, he found the air to give no indication of ozone.

The fallacies and difficulties connected with ozonometry are fully appreciated by our author. Nitric acid, and, according to Cloëz, certain vegetable oils and vapours are mentioned as giving similar results with ozonometric paper, prepared with iodide of potassium, starch and water. Moreover, as other writers have shown, the movement or stillness of the air makes a decided difference in the indications. Captain Humbert and Dr. Arthur Mitchell, in Algiers, with places of observation not far separated, but one eighty feet higher than the other, found great and frequent discrepancies between them.[1] Dr. Hammond does not allude to the test mentioned by Boudin,[2] consisting of a paper impregnated with sulphate or chloride (*chlorure*) of magnesia; the decomposition of the salt producing a brown tint, of various degrees of depth. Dr. Hammond is no doubt correct in his final conclusion, thus expressed (p. 166):—

"Some later writers deny that ozone is ever present in the atmosphere. We are not able to say positively that it is; we only know that there is an element in it which possesses the reaction of ozone. Till our ozonometrical processes are improved, it is not probable that we will arrive at any more definite information. There is every assurance that a vast field of inquiry exists in this direction, the investigation of which cannot fail to enlighten us relative to the causation of many diseases which now defy our utmost powers of research."

Organic matters in the atmosphere are next considered, in some very interesting remarks. Dr. Hammond frequently sought, in the atmosphere as well as in the discharges of cholera patients, for the so-called "cholera cell;" but never met with it. His observations enable him to correct the statement of Pouchet, that the ova of infusoria and the spores of fungi are never to be found in the atmosphere.

"While agreeing with him relative to the great predominance of starch granules, I am sure that I have discovered bodies which presented all the characteristics of ova of infusoria, and spores of cryptogamic plants. The instrument made use of in the examinations did not vary materially from that employed by Pouchet. It consisted of a glass tube, two inches in diameter, closed at each end by a well-fitting cork. One of these corks was perforated

[1] Brit. and Foreign Medico-Chirug. Rev., Jan. 1856.
[2] Traité de Géographie et de Statistique Médicales, &c., vol. i. p. 160.

so as to receive the pointed extremity of a small copper funnel, the other was connected with an aspirator. Into the large tube a square piece of glass was introduced, and placed at the distance of about the $\frac{1}{12}$th of an inch from the extremity of the copper funnel. When the aspirator was set in action by opening the stopcock, the air entered the funnel and impinged upon the glass plate, where it deposited its morphological constituents. After an hour or two the plate was removed, and submitted to microscopical examination. Frequently I obtained the spores of penicilium and of other mucedines, and occasionally dried infusoria of the more common varieties." (p. 174.)

On the very important subject of malaria, Dr. Hammond regards with considerable favour the "fungus theory" of the late Dr. J. K. Mitchell; having himself ascertained the occurrence of immense quantities of spores, especially the bassidiospores of hymenomycetous and gasteromycetous fungi, in the atmosphere of malarious localities. Besides the remarkable properties of the *amanita muscaria*, allusion is also made to Dr. B. W. Richardson's observations upon the narcotic and anæsthetic properties of *lycoperdon proteus*, or common puff-ball. Dr. Hammond has confirmed the statements of the latter, by experiments upon animals as well as upon himself. Still, these effects do not constitute specific fever. More immediately to the purpose are the singular experiences of Dr. Salisbury, of Ohio, quoted from this Journal,[1] in regard to the apparent production of measles by contact or inoculation with fungous growths attaching themselves to damp and mouldy wheat straw. One of the most remarkable examples of disease produced by a fungous vegetation is that called *mycetoma* by its describer, Dr. Carter, of Bombay; in which the plant acts as a parasite, causing swelling and abscess, followed by sinuses, only curable by amputation.[2] Here, again, however, we have nothing like the effects of local miasmata.

After a clear and concise statement of the best established "laws and habits which influence malaria," Dr. Hammond gives a very favourable opinion of the preventive power of quinia and cinchonia against malarial disease. Two grains of the sulphate of quinia, or four of sulphate of cinchonia daily, are considered to be sufficient for those unavoidably exposed; although medical officers are enjoined always to urge the choice, for camps or barracks, etc., of healthy localities. The above doses of the preventive appear to us rather small. Although DuChaillu ascribed his immunity in Africa to a single grain of quinine daily, yet Livingstone was disappointed, in other parts of the same continent, with the constant use of thrice as much. The building of fires throughout a camp, when necessarily placed in a miasmatic region, is strongly recommended by Dr. Hammond.

Restricting the word malaria, apparently, to its original Italian sense, our author does not enter upon the subject of the causation or prevention of yellow fever or other endemics or epidemics. In the short chapter upon the physical properties of the atmosphere, it is stated, in regard to cholera, that a very considerable rise in the barometer occurred, while this disease was prevailing, at the several posts and garrisons of the United States Army, in 1849.

Temperature, Light and Electricity, in their hygienic relations, have each a chapter. The important fact is mentioned, that according to a table prepared at the Surgeon-General's office by Assistant-Surgeon J. J. Woodward, U.S.A., the sickness and mortality of the United States forces have, since the commencement of the rebellion, been much less during the winter

[1] July, 1862. [2] Brit. and For. Medico-Chirurg. Rev., July, 1863.

months than during the summer. This is true at least as far as the estimate was made, of all the diseases of five armies, comprising about three hundred thousand troops. These results are, as Dr. Hammond remarks, different from those obtained in European countries.

A good and full chapter follows upon Water. We can find no fault with any part of it, unless it be with the recommendation to drink several tumblerfuls of water at every meal (p. 224). Somewhat startling this advice may seem to a dietarian in Europe; where, from the light wines of the Romanic races, through the beers of the Teutonic, up to the strong spirits of the Northern Celt, all conspire, we will not say by instinct, but by habit, to avoid pure water at the table. No doubt this country may have the advantage, as a matter of hygiene, over the rest of the civilized world, in the predominantly aqueous nature of its regimen; but even this may be carried too far. Dr. Hammond sustains the above recommendation, however, by actual experiment.

"I fed a dog moderately, and then administered to it a pint of water; fifteen minutes afterward the animal was killed by division of the medulla. On opening the stomach, having previously tied it at its cardiac and pyloric openings, nearly all the water was found to have been absorbed. The food was as far advanced in the process of digestion as it should have been for the period during which it had been in the stomach. There was the ordinary quantity of gastric juice present."

Exaggeration is considered by Dr. Hammond to exist in popular works in regard to microscopic infusorial or algoid organisms in drinking water. It is only such water as is overstocked with them or contains zygnemaceæ, diatomaceæ, or the spores of fungi, that is objectionable. A green scum of confervoid growths does not indicate impurity of the water. Organic matter in solution, as our author states, may be readily detected and estimated by the permanganate of potassa, or Condy's solution of permanganates. A drop of saturated solution of the permanganate of potassa added to a half pint of distilled water, gives to it a beautiful and permanent pink colour; but the presence of organic matter causes the destruction or *prevention* of this colour. Of a standard solution, Dr. Hammond found that it required four drops to give a fixed colour to ten ounces of the water introduced into the city of Washington; eighteen to produce the same result with water collected from a marsh near the city, and twenty-seven in the water of a canal which flows through the town.

Upon the subject of Bathing, mention is made of the observations of Beneke and Lévy upon the effects of sea-bathing. It should be remembered that some doubt has been thrown over the results of the former, as well as over those of some other investigations into the changes of tissue-metamorphosis, by the searching analyses of Radiche, of Bonn.[1] In regard to urine, for example, both he and Vierordt have found that a certain wave-like increase and decrease occurs, which might induce a difference of results according to the day chosen for experiment. Dr. Hammond omits remarking upon the length of *time* suitable for immersion in the cold bath; a very important point; since a rapid plunge may produce reaction in many to whom a prolonged immersion would be injurious or dangerous. The effects of the tepid as distinguished from the warm bath are also overlooked. An ingenious and excellent contrivance of M. Dunal, of Marseilles, for giving the shower-bath to soldiers, three or four at a time, so that three hundred and fifty could pass through it in four hours, is described (p. 239).

[1] Archiv. für Phys. Heilk. 1858, p. 145.

Filtration is very carefully and well discussed; the preference being given to charcoal filters, or those of porous bisque. For distillation, Dr. Normandy's apparatus, which aerates as well as purifies the water, is particularly recommended.

A short chapter is given to the topic of Soil. It contains, besides Schübler's tables of the relative capacity of different soils to absorb and give out heat and moisture, some experiments made by the author upon the comparative power of sand, clay, and humus to absorb matters exhaled from organic decomposition. This is a very important inquiry, as aiding in the choice of localities for camps or barracks. Humus stood highest, in its facility of absorption and subsequent emanation of the volatile results of putrefaction and decay; and pure sand lowest, clay, and a mixture of sand, clay, and marl, being intermediate. In the next succeeding chapter, upon Locality, we meet with the incidental expression of Dr. Hammond's opinion, based in part upon *post-mortem* examinations, that the "mountain fever" of the hunters of the Rocky Mountains is scarcely distinguishable from the ordinary typhoid fever of the country. On two occasions he discovered, after death, in such cases, "the usual diseased condition of Peyer's glands."

The large subjects of Climate and Acclimation are well considered in the 10th and 11th chapters of our author's 3d section. Would not *acclimatization* be a better word? The French *acclimatement* is euphonious enough, but the English word adopted by Dr. Hammond and others generally, and still more the verb "to acclimate" sound un-English to our ears. The belief in the multiple origin of human races has not prevented Dr. Hammond from advancing very sound views in regard to the naturalization of man in new climates. He denies, not too emphatically, the current notion that the Caucasian or European stock degenerates in America. If we do grow somewhat Indian in the average of our American face and figure, yet it remains true that "as the result of over fifteen thousand observations, embracing the chief points desirable in a collection of vital statistics, I am enabled to assert, that, so far as physical development is concerned, it is very doubtful if any people in the world excel those of the Northern States." Of the other apparent failures in the effort at transplantation, as of the English in the East and West Indies, and of various Europeans in the Arctic regions, the true explanation is asserted to consist in the attempt being made without the mode of life being adapted to the changed conditions under which the organism is placed. An eloquent passage is quoted from Lévy[1] to this affect. We meet in Boudin[2] a discussion of one of the most difficult problems of the kind, that of the future of the French in Algeria. His conclusions are not quite in harmony with those above stated, although he admits that they are not yet final. After quoting, amongst others, General Duvivier, who declares that "*les cimetières sont les seules colonies toujours croissantes de l'Algérie*," and giving many statistics of mortality and disease, Boudin ends thus: "The acclimatization of the French in Algiers in the agricultural state is, so far, but a hypothesis; its possibility remains to be proven."

Dr. Hammond cites the instructive experience of Dr. I. I. Hayes upon the conditions necessary to the maintenance of health in arctic explorations. It was ascertained by this navigator that the highest inhabited latitudes afforded "a climate of remarkable healthfulness," exemption even from scurvy being secured by adopting the regimen of the Esquimaux, who live

[1] Traité de Hygiène.

[2] Traité de Géographie et de Statistique Médicales, etc., tome ii. p. 171.

almost exclusively upon fresh fat meat, abundantly consumed. This was also more nutritious and anti-scorbutic when eaten raw—congelation removing the repulsiveness of ordinary raw meat. Alcohol was considered by Dr. Kane and Dr. Hayes as useless and even injurious in very cold climates. Such is, indeed, the general testimony of arctic voyagers.

Much the most important portion of Dr. Hammond's book comes next before us; his eight chapters, comprising one hundred and fifty-six pages, upon Hospitals, Camps, and Barracks. It would seem to us a more natural arrangement to conclude first his discussion of what might be called the Principles of Hygiene (of which all that concerns food and clothing is left by him to the end of the volume), and then to take up their practical application to the economy of health in individuals and in armies. The substance, however, of these chapters is so interesting and so valuable that we need not pause to quarrel with their arrangement.

The literature of hospitals has not, so far, been extensive. Since the time of Pringle, Brocklesby, and Aiken, who agreed that hospitals were, as then conducted, a curse instead of a blessing, although John Howard, Sir Gilbert Blane, Iberti, and others, did their share towards inaugurating the needed reform, very few have given the subject the attention it deserves. No one has contributed more valuable practical matter in regard to it than Florence Nightingale;[1] and to her work, and the "Etude sur les Hôpitaux"[2] of M. Husson, the "Suggestions" of Roberton, and the Report of the Commission of Inquiry in Great Britain, all recent study upon the topics of hospital construction and management, so far as books are concerned, might till now have been confined. Surgeon-General Hammond has had the advantage of the largest possible experimental as well as theoretical examination of the whole subject. We may expect, therefore, to find in his book the latest and best ideas, the soundest principles of hospital construction and arrangement. Nor are we disappointed in this expectation.

The credit of taking the lead in the actual and essential improvement of the modern hospital system is, we believe, divided between Italy[3] and Belgium. There are some who still consider the Belgian hospitals (unless in regard to their latrines) the best in the world. In France a commission was appointed in 1786 to report a plan for the rebuilding of the Hôtel Dieu; but their recommendations, including the now approved pavilion system, were not acted upon until much later, when the Lariboisière was the result. In Germany the reform yet lags behind, and in Holland has scarcely begun. The Portuguese government has at least shown a liberal disposition in sending, not long since, a medical commissioner on a tour of inspection through Europe. In Great Britain many defective hospitals exist, both old and new; but in others the now established principles of hygiene are properly applied. A great stimulus to interest in the subject in this country has been afforded by the present war, although all the new military hospitals constructed so far have been "temporary," the longest time expected for their duration by Surgeon-General Hammond being ten years. The question will suggest itself at once: Is this wise? It would certainly have been thought otherwise in England or on the continent of

[1] Notes on Hospitals: being two Papers read before the National Association for the Promotion of Social Science, at Liverpool, October, 1858; with Evidence given to the Royal Commissioners on the State of the Army, in 1857. By Florence Nightingale. London, 1859.

[2] Paris. 1862.

[3] The annual endowment of the hospitals of Rome is over $250,000; those in Florence and Milan, however, are in some respects superior. Italian hospitals are especially remarkable for the *height* of their wards. They have not, however, kept pace with the more recent improvements.

Europe. There the "permanent method" for all important institutions is believed to be most economical; and, in a parallel case, if such could there occur, at least two or three first-class permanent hospitals would have been erected, at selected centres, at very little more cost, and with, we believe, better economy in the end, than attends the vast but slight structures now used for the victims of our war. Of course a great number of additional strictly temporary hospitals would still have been needed, relying upon the temporary duration of the war itself. But the genius of our people aims at the doing and making of everything quickly as well as largely; progress and improvement are ever in view; and all things connected with this rebellion have been so unprecedented, so beyond expectation or calculation, so often experimental, that no individual or authority can be fairly criticized for limiting anticipation and provision to short periods.

We meet first, in the work before us, excellent remarks upon the general principles of hospital location and construction. As bad examples of locality, the hospital of the Guards' recruiting barrack, at Croydon, the U. S. hospital at Fort Meade, in Florida, and the Hôtel Dieu upon the Seine, in Paris, are mentioned. A gravelly soil and an elevated site are best. The hospital at Fort Mackinac, lately erected, is upon the solid rock. Of materials, stone is the best for permanent hospitals; for the temporary, wood, plastered inside and out. The best lining for walls is Parian cement, although it is expensive; hard-finished plaster, well painted and varnished, is the next in advantage to it. We find Florence Nightingale, however, positively condemning plaster as well as whitewashed brick walls; insisting that "pure, white, polished, non-absorbent cement is the only fit material."[1] This authority agrees with Surgeon-General Hammond in urging that the floors should be of oak, saturated with a mixture of beeswax, turpentine, and linseed oil. With this, the necessity of scouring the floors is done away with, and wet and dry rubbing will keep them pure and fresh. We believe that mischief is often done by too much wetting of ordinary hospital floors; having seen a general catarrh, or bronchitis, or worse affections, follow its periodical occurrence; and can well credit F. Nightingale's assertion, that "there cannot be a doubt that washing floors is one cause of erysipelas, &c., in some hospitals."

Dr. Hammond asserts that the temporary "are far healthier than permanent buildings; an assertion the truth of which has been thoroughly demonstrated during the present rebellion. For wounded men, tents, both in winter and summer, are the best of all hospitals." (p. 310.) We have no doubt of the accuracy of the comparison above cited, between the temporary and permanent hospitals in which the sick and wounded of our army have been treated during the rebellion. But what kind of permanent hospitals are they? Although some few of the best civil hospitals have made partial arrangements for military patients, the bulk of the army hospital service in permanent *buildings* has been, from the nature of the emergency, in edifices built for quite other purposes, mostly in or very near to large cities. We must, therefore, with due respect, hesitate to accept the verdict of preference for the temporary over the permanent hospital, "cæteris paribus," as absolute and final.

[1] Notes on Hospitals, p. 15. A wash of soluble glass, or a solution of silicate of potash, recently proposed as a water-proof paint for brick walls, would probably afford the most effectual and cheapest substitute for the Parian cement, whether applied to brick or plaster.

As general principles, for every hospital it is essential:—

"1st. That it is capable of being well ventilated.
2d. That it is sufficiently capacious for the number of inmates it is to contain.
3d. That it admits of good drainage.
4th. That it is provided with a sufficient number of windows.
5th. That the kitchen, laundry, and other offices of administration are well arranged and of ample size.
6th. That efficient water-closet, ablution, and bathing accommodations are provided.
7th. That it is amply supplied with water, and gas or other means of illumination.
8th. That the furniture, of all kinds, is of suitable quality.
9th. That the officers and attendants have their proper respective duties assigned to them, and that they are in number sufficient for the wants of the sick.
10th. That proper rules are established for the government of the hospital, for the diet of the inmates, and for preserving order and an efficient state of police." (p. 310.)

Of all possible plans for the construction of a hospital, that of the closed court or holiow square is evidently, as our author remarks, one of the worst, although one of the oldest. The Bicêtre, the Salpétrière, the Saint Louis, and Maison Municipale de Santé, of Paris, Guy's Hospital, at London, and the Ospitale Maggiore di Milano are all upon this plan, as is also the newer military hospital at Algiers. Scarcely better than this is that in which the wards are crowded together in pairs or by fours, as in all the U. S. Marine Hospitals of the first class, and in the Hôpital de la Clinique of Paris, which was originally a monastery. The new Victoria hospital at Netley, constructed without advice of the medical department, although the most extensive military hospital in Great Britain, exhibits a very faulty design. The wards are small, having from nine to fourteen beds, and generally have but one face exposed to the external air. Crowding of wards, in double row, is also a very serious defect in the new hospital of King's College, London.

In the work before us, a most valuable feature is that all exposition of principles in regard to hospitals, and criticism of condemned as well as of approved examples, is made lucid and demonstrative by ample illustration, with the aid of ground-plans and elevations. Without these, it is impossible, in review, to do justice to this part of the book, which every one interested should study for himself as the best of manuals upon hospitals.

Further important rules laid down by Surg.-Gen. Hammond are, that the long axis of every hospital building should run north and south, so that both sides may have the sun on them a part of the day, and that the first floor should not be upon the ground nor over a cellar, but elevated by a basement, or by pillars, to a height of three or four feet above the surface. He objects, also, to a hospital ever consisting of more than two floors of wards, and considers one preferable—the difficulty of administration more than outweighing, in his view, any advantage belonging to two. This does not seem to have been the opinion of those who planned some of the best modern hospitals, as the Lariboisière and the military hospital at Vincennes, each of which consists of three-storied pavilions. It has been established, as Dr. Hammond admits, that the upper rooms in buildings are more healthy than the lower; but he insists that not more than one hundred sick should be kept under one roof, whether in one or several rooms.[1]

[1] At the Lariboisière, with three flats, each pavilion has but one hundred and two beds.

No doubt a third story ward, to be salubrious, requires as high a ceiling as lower ones, and still more free admission and exit of air, as organic exhalations ascend. But, with such conditions, we cannot realize the weight of the objection to an arrangement like that of the Episcopal Hospital at Philadelphia, which has, besides an elevated basement, in each pavilion, two floors of wards and a well-ventilated attic, the latter having a double roof and being not always used, but reserved for special cases. In our climate, in summer, the burning heat of the sun upon a roof is so intense, that the uppermost room might often with advantage be left empty, or used for storage. Although the system of ridge ventilation, preferred by Dr. Hammond, can only be applied to a single or upper story, yet, by having a double wall, the same principle, essentially, may be extended to a first floor, or second, by maintaining a free and permanent communication between the lower room (along the side walls under the ceiling), and the intramural passage leading to the ridge above.

The arrangement of a ward and its accessories is the hospital unit. A large hospital is, then, as Dr. Hammond remarks, a sort of polyp. A ward should be oblong, with only two rows of beds, a window to each two beds, and a width not greater than twenty-five feet, to prevent stagnation of the air in the centre of the room. The very lowest dimensions admitted by Dr. Hammond as allowable for permanent hospitals, are, for a ward of fifty beds, one hundred and seventy-five feet of length, twenty-five of width, and fourteen of height. This will give one thousand two hundred and five cubic feet to each patient. Florence Nightingale's *minimum* is one thousand five hundred cubic feet for each; and that appears to be the European theoretical standard. The same authority prefers thirty-two patients to any other number for a single ward, and calls for a territory of eight feet by twelve for each bed. In regard to height, Dr. Hammond directs "not less than fourteen feet; in permanent hospitals not over sixteen. Less than this renders the air close, while more is of little or no advantage." It is urged by some, that a "hospital atmosphere" is more apt to be formed in a ward of great than of medium height. We cannot believe this to depend on anything but the disposition of the windows, or other ventilating means; and this impression has not been formed without some opportunity of comparison. In the loftiest buildings in the world, such as the cathedrals of the Old World, there is the least possible feeling of closeness, although they are much shut up, and often have large numbers of human beings within them. A lofty ward, otherwise well proportioned, as at the Santo Spirito Hospital at Rome,[1] appears to us to afford, with high windows, admirable facility of ventilation. It is true, no doubt, that, as our author observes, it is by no means impossible to produce sickness in well persons by crowding them together in the open air. But this is only the case with very close crowding indeed; and, with difference of temperature within and without, if openings be allowed, currents of air are probably more *constantly* present within a well-ventilated, large room than out of doors, although with such slow movement as not often to be perceived. Florence Nightingale considers that "with from twenty to thirty-two sick, a height of fifteen to seventeen feet is enough, but it would not be enough for more."[2] "A ward of double the size may be rendered perfectly healthy by having a

[1] This hospital, notwithstanding an insalubrious situation, has, with nearly fifteen thousand annual admissions of all diseases, an annual mortality of little more than seven and three-quarters per cent.

[2] Notes on Hospitals, p. 57.

height in proportion to its width." Her objection to great height is, simply, its expense.[1] Our judgment goes decidedly with that of Dr. Ordronaux,[2] that "ceilings should be high; the higher the better." Of course, the windows should be high also, reaching to the ceiling. About one-half of the walls of a ward should, if possible, be glass; and the best windows are those which extend from floor to ceiling—the whole height of the walls.

The accessories which are indispensable to every ward are, a bath and ablution room, a water-closet, and a ward-master's room. A mess-room is often added for convalescents.

In the general plan of a hospital, as Dr. Hammond observes, reducing it to its simplest form, two factors are to be considered—the ward and its administration; the latter is constant, the other variable. There may be many wards with but one administration.

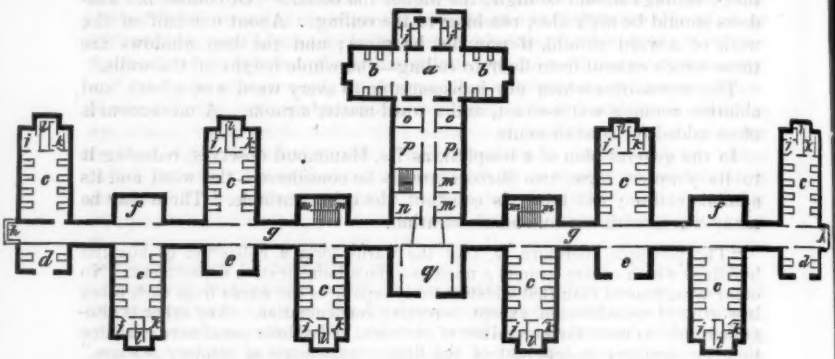
"The principle, therefore, is, that the wards form a collection of hospital buildings which centre around a nucleus—the administrative department. No other arrangement than that which entirely separates the wards from each other is worthy of consideration, except to receive condemnation. Any other is altogether unfit to meet the necessities of the sick, and affords conclusive evidence that the designer is ignorant of the first requirements of sanitary science." (p. 331.)

So far does Dr. Hammond urge this principle of *ward separation*, that he criticizes, on a later page (p. 363), an arrangement by which, in certain hospitals, "the partitions separating the wards from the corridor do not extend to the peak of the roof; it is thus possible to throw a stone, for instance, from one ward into another, and thus all the advantages of the pavilion system are lost." If, however, the corridor be sufficiently wide, and the distance between the ward-pavilions twice, or more than twice their height, we must risk the above threatened condemnation so far as to confess our inability to see the advantage of *shutting off any part of the aerial circulation* through a hospital. Partitions seem to us merely necessary evils, hygienically considered, however unavoidable they may be for certain parts of the administration. The separation, to be perfect, should be aerial, that is by ventilating draughts through and upwards between the wards, rather than by board or brick walls.

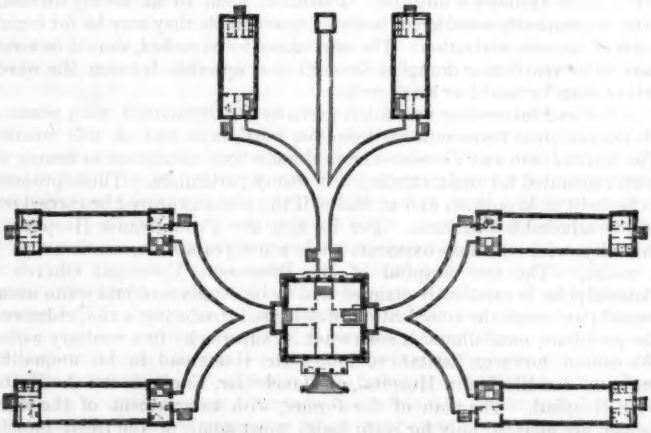
A full and interesting account is given by Dr. Hammond, with plans, of all the principal representative hospitals of Europe and of this country. The Lariboisière and Vincennes have already been mentioned as among the most celebrated for their excellence in many particulars. Those proposed to be built at Woolwich and at Malta, if the plans approved be carried out, will be admirable structures. For its size, the Pennsylvania Hospital in this city, with the improvements made a few years since, continues to be a model. The new hospital of the Protestant Episcopal Church of Philadelphia, is excellently planned, and in its details no doubt quite unsurpassed; although the combination of designs, introducing a chapel between the pavilions, must diminish somewhat its superiority in a sanitary aspect. We cannot, however, hesitate to follow Dr. Hammond in his unqualified praise of the Blackburn Hospital, of Manchester, England, and the Boston Free Hospital. The plan of the former, with enlargement of the wards (which are adapted only for eight beds), must admit of the freest possible circulation of air; the pavilions alternating, so to speak, along the sides of the corridor, and thus doubling the distance between those upon the same side. Nothing could be much better than this. Two military hospitals

[1] Notes on Hospitals, p. 58. [2] Hints on Health in Armies, p. 111.

in this country are upon this plan, slightly modified; the Mount Pleasant Hospital, and Judiciary Square Hospital, at Washington, D. C.



The Boston Free Hospital embraces six separate pavilions, radiating from a central structure, but entirely disconnected with this building excepting by corridors or walks, each of the quadrant of a circle in form. There are two parallel pavilions on each of three sides of the building, and eighty feet from it. The pavilions are one hundred feet apart in the clear. Each is two finished stories in height, with a basement. Four of them accommodate fifty patients each, the other two twenty-five. Each patient will have about one thousand six hundred cubic feet of space. The plan is designed for two hundred and fifty patients.

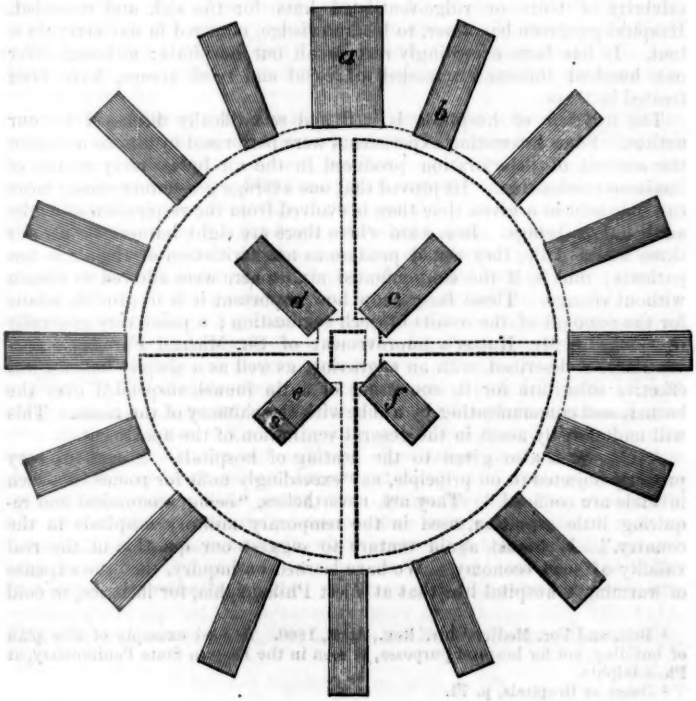


An extended and highly interesting description is also given by Dr. Hammond of the military hospitals of the United States; most of which have been erected under his administration, and by his immediate direction. The largest of these, and the largest hospital in the world for the sick and

wounded alone, is the Mower General Hospital at Chestnut Hill, near Philadelphia. It contains two thousand eight hundred and twenty beds for patients, besides five hundred for the officers and attendants. The wards are contained in fifty one-story pavilions, radiating from an ellipsoidal corridor; the latter being the circumference of an area of three hundred and forty-one thousand four hundred and sixty-six square feet. It is amply supplied with water, and lit by gas, and the drainage is complete.

The West Philadelphia Hospital accommodates, when full, three thousand one hundred and twenty-four patients. Its dimensions, however, are not quite equal to those of the hospital at Chestnut Hill. The pavilions, at West Philadelphia, are arranged on parallel rows on each side of a long corridor. The McClellan Hospital, at Nicetown, is composed of radiating pavilions, less crowded than at Chestnut Hill, connected with an elliptical corridor, and affording room for one thousand and forty beds.

The greatest excellence of design, however, appears to us to belong to the plan of the Hammond Hospital, at Point Lookout, on Chesapeake Bay. This consists of sixteen pavilions radiating from a circular open corridor. The pavilions are thirty-six feet distant from each other at the corridor, and seventy-five at the other end. One pavilion is for administrative purposes. Each of the fifteen wards contains fifty-two beds, making a total of seven hundred and eighty.



A view is given by Dr. Hammond (p. 381) of a design of Poyet (Paris, 1786) for a radiating hospital, to contain five thousand patients. This was never carried out. Some approach to it is made in a few of the Italian hospitals. Dr. Parkes[1] suggested a crescentic radiating plan; the half, as it were, of that of the Hammond Hospital. We are aware that all sanitarians are not agreed in approving of radiation in any shape or modification in the construction of hospitals; but, whatever secondary difficulties may occur in them, it seems that, if obstructive partitions are not allowed to check the flow of air throughout all the diameters of the circle, such a plan most nearly approaches the realization of the hospital ideal. This is expressed tersely by F. Nightingale: "All that has to be manufactured"—*i. e.*, all sorts of administration—" should be, as much as possible, concentrated into one; while human beings, sick or well, should be distributed as much as possible."[2]

Field hospitals, Dr. Hammond avers, are best composed of tents, both for summer and winter. The U. S. army hospital tent is fifteen feet square, and should not be made to hold more than six or eight men. The conical tent is not well adapted to hospital purposes. The best of all arrangements for hospital tents or huts is said to be *en échelon;* the distance between any two being twice the height. The floor of each tent should be raised a foot or eighteen inches above the ground, and this space left open to the air. Dr. Hammond has a very high opinion of the salubrity of tents or ridge-ventilated huts for the sick and wounded. Hospital gangrene has never, to his knowledge, occurred in our army, in a tent. It has been exceedingly rare in all our hospitals; although over one hundred thousand wounded, of loyal and rebel troops, have been treated in them.

The lighting of hospitals is well and scientifically discussed by our author. Some interesting experiments were performed by him to ascertain the amount of deterioration produced in the air by ordinary modes of luminous combustion. He proved that one average gas-burner causes more carbonic acid in a given time than is evolved from the respiration of eight adult human beings. In a ward where there are eight burners in use for three hours daily, they would produce as much vitiation of the air as ten patients; that is, if the contaminated atmosphere were allowed to remain without change. These facts show how important it is to provide means for the removal of the results of such combustion; a point very generally overlooked. Mr. Rutter's improvement of Sir Michael Faraday's gas-ventilator is described, with an engraving, as well as a simpler but not less effective substitute for it, consisting of a tin funnel, suspended over the burner, and communicating by a tube with the chimney of the room. This will undoubtedly assist in the general ventilation of the apartment.

A chapter is also given to the heating of hospitals. Stoves are very properly objected to on principle, as "exceedingly unfit for rooms in which invalids are confined." They are, nevertheless, "being economical and requiring little attention, used in the temporary military hospitals in the country." We must again venture to suggest our question of the real validity of such economy. We have learned on inquiry, that the expense of warming a hospital like that at West Philadelphia, for instance, in cold

[1] Brit. and For. Medico-Chir. Rev., April, 1860. A good example of this plan of building, not for hospital purposes, is seen in the Eastern State Penitentiary, at Philadelphia.

[2] Notes on Hospitals, p. 74.

weather, is enormous. Dr. Hammond considers it decided, that hot water, distributed in pipes, is superior to steam, or to any other means of heating large buildings. It is more uniform than steam, as well as more economical. Florence Nightingale prefers open fire-places to everything else.

We are thus brought to the topic of ventilation, which is admirably treated of by Dr. Hammond. Many of his facts are the result of his own carefully conducted experiments. Having recently examined the wards of several military hospitals, he found the one least ventilated to contain 2.11 parts of carbonic acid in 1000 of air. In the best, the proportion of this gas was 0.68 in 1000 volumes of the contained atmosphere, while outside it was but 0.37 in 1000. Le Blanc found 8 parts in 1000 at the Salpétrière, and Ramon de Luna 4.3 parts in the General Hospital at Madrid. In a room occupied by three adults for two hours, the windows and doors being closed, Dr. Hammond found the air eight inches from the floor to contain 8.3 parts of carbonic acid in 1000; twelve feet above the floor, 6.8 parts in 1000. Organic matter, on the contrary, tested by a standard solution of permanganate of potassa, was much more abundant at the highest point, as it required, at the elevation of eight inches, eight hundred and sixty-five cubic inches of air to produce decolorization in a solution upon which the same effect was produced by six hundred and eighty cubic inches at twelve feet.

The importance, for healthy respiration, of a constantly *moving* and *changing* mass of air, is forcibly urged. An allowance of twenty cubic feet of fresh air per minute should be the minimum. Vierordt's statement is quoted as being only two and a half cubic feet. Experiments at the Lariboisière seem to point to four thousand cubic feet per bed per hour as a safe proportion.[1]

By actual examination, Dr. Hammond found the amount of carbonic acid in a room occupied by him while closed for six hours, and then aired by opening the window and door, reduced from 0.72 per cent., before airing, to 0.39 per cent. after fifty-five minutes exposure to draught; the latter percentage being the proportion of the outer air. He has also seen the air of a room containing five thousand cubic feet, entirely renewed in five minutes, by the windows and doors alone, when a moderate breeze was blowing. Surely, these facts argue much in favour of "natural" ventilation; a somewhat questionable *term* (especially in furnace-warmed houses), but a very desirable *thing*. Miss Nightingale well says, that "artificial ventilation is only a *pis aller*;" our grandfathers' lofty fireplaces being considered by her the greatest loss in modern architecture. As Dr. Hammond states, however, in this climate doors and windows cannot be left open in cold weather, and it is necessary to provide a more efficient ventilation of hospital wards in winter. The methods approved by him, and which have had the test of very extensive and successful application in a number of large pavilion military hospitals, are, for comparatively mild weather, the ridge-ventilation; for the coldest season, what might be called the stove-shaft. The former consists essentially in leaving an opening, ten inches wide, at the ridge of the pavilion along its whole length, this opening being covered by a roof projecting at least two feet on each side, and elevated about four inches above the lower floor. A narrow strip along the margins of the opening guard against the entrance of snow or rain (pp. 355, 395, 441). This plan was in use, under direction of the British Sanitary Commission,

[1] Florence Nightingale, op. citat., p. 100.

in the Crimea. For full effectiveness, it requires that the walls should be double, and that air should be admitted from without, near the floor of the pavilion or hut. The openings for fresh air into the ward should be covered with perforated iron or other metallic plates. This last is a most valuable provision, and one calculated to be of great service as an adjuvant to, or modification of, window ventilation. A draught may be checked by such a plate, put in the place of a pane in a window, and the air thus so tempered by subdivision that it may be safely introduced in the coldest weather. The plan of winter ventilation adopted by Surg.-Gen. Hammond for use where stoves are employed for heat, is also very simple. A hole is cut in the floor, under each stove, through this air enters, being conducted from the outside by a wooden box or flue under the floor. This fresh air is prevented from spreading, while cold, over the floor, by a zinc jacket which partially incloses the stove, and thus forces the current upwards along the heated surface, until heat enough is imparted to secure the proper effect. Impure air is carried out by means of a perpendicular wooden box, almost surrounding the stove-pipe, and emerging at the ridge of the roof.

The simplest idea of natural ventilation is, it appears to us, to keep every building and part of a building, in warm weather, as open as possible on all sides; and, certainly, the most rational principle of artificial ventilation must be to take advantage of the upward currents produced by the means resorted to for producing heat, and thus insure, with sufficient openings, a circulation of air. It is scarcely going too far to say, that no building ought ever to be constructed so as not to be capable of sufficient ventilation by either of these two modes.

Barracks and camps are discussed by our author with the science of an expert, clear and full statements being given of all that concerns their hygiene. The sanitary condition of the camps of the United States Army, during the rebellion, is said to have been, with some few exceptions, excellent; the general ratio of sickness being much less than was ever met with before in a large army engaged in active operations. Even during peace, as our author testifies, camps have seldom exhibited a more favourable state of health.

We forbear attempting the task of analyzing the nine remaining chapters of the volume before us, upon Alimentation and Clothing. These chapters might very well be made the subject of a separate review; indeed would require it, to do their author and our readers sufficient justice. They are well elaborated, not only with research, but with many practical applications of great value and much original matter, including the results of those physiological experiments and observations whose previous publication has made their author known in Europe as well as in this country as one of the leading physiologists of the age.

Dr. Hammond's style is uniformly easy, lucid, and agreeable, making what the general as well as the professional reader will find a very readable book. In his preface it is stated, that several subjects are omitted or postponed, whose consideration would have been appropriate to a work on Hygiene. We are confident that a demand will soon occur for another edition. With the opportunity thus afforded, it may be anticipated that Surg.-Gen. Hammond's matured work will be pronounced not only, as now, the most important Treatise on Hygiene in the English language, but the best extant.

H. H.

ART. XIII. — *The Pharmacopœia of the United States of America.* Fourth Decennial Revision. By authority of the National Convention for revising the Pharmacopœia, held at Washington, A. D. 1860. Philadelphia: J. B. Lippincott & Co., 1863.

EACH appearance of the *United States Pharmacopœia* at decennial periods may be said to inaugurate a new epoch in the pharmacy of this country. The work is looked for with interest by the physician and the pharmaceutist as the guide by which he is to be directed in his endeavours to mitigate the evils of disease, and with the expectation that, while retaining all that is good and that has been sanctioned by the experience of the past, it has been rendered additionally worthy of reliance by embodying the contributions made to science in the interim of its previous revision.

The present issue has been more than usually delayed, and it would appear that the anxiety of the public to possess the work has not been diminished by the postponement of its publication. The inquiry for it has been general and emphatic, but perhaps with some want of appreciation of the effort entailed upon the compilers, to whom, as a task of love for science purely, and with the willingness to render their knowledge and skill profitable to their fellow citizens, the enterprise of garnering up and putting into form the pharmaceutical improvements of a decennial period has been intrusted. The revision and publication of this standard work is no small undertaking, and as stated in the preface, "the Committee of Revision and Publication have realized this fact in the large amount of labour they have encountered in duly examining the mass of materials, manuscript and printed, bearing upon the proper execution of their duties." In extenuation it may be further stated that the revision of the *British Pharmacopœia*, which was commenced some time before that of the United States, has not yetbeen fully completed.

It is our intention in the present notice to enter into an analysis of the modifications and changes which have been introduced into our new National Authority, and to make them as perspicuous to the reader as it is in our power to accomplish. The work is now before the community, and will be judged in accordance with its deserts. Its merits or demerits can only be fully estimated when practical experience has been brought to bear upon the numerous details which are presented, and time will be required for the just appreciation of them. Until this has been done no enlightened criticism can be indulged in.

With the view to facilitate the exposition of the alterations and amendments in the revision before us, it will be expedient to arrange them in their natural order, or in accordance with the purposes and objects designed to be attained in the construction of a Pharmacopœia. By so doing we will be enabled to exhibit methodically, under their appropriate heads, the various items, and to give to them the force which is necessary to their proper comprehension. Upon this plan each alteration or supposed improvement can be satisfactorily exhibited, with the statement of the reasons which have prompted its adoption.

A Pharmacopœia then may be stated to be designed, first, to present a *list* of all the medicines which may be profitably employed in the practice of medicine, including those which have been long used and sanctioned by experience, as well as others which have attained sufficient notoriety to

render them worthy of enumeration. Our own Pharmacopœia has classified medicines so as to pertain to the most important, which is called the *primary list*, or to a subordinate one which is termed the *secondary list*. When an article has remained for a sufficient length of time in the secondary, to test its value and to establish a decided reputation, it may be elevated to the rank of the primary list, or if it has gone into disuse, may be dismissed from either. In this way there is provision against redundancy, and yet safety in securing the use of a reliable article of the materia medica. We are informed that "the list of the Materia Medica has undergone the usual modifications of introductions and dismissions. Fifty-five medicines have been introduced, and twenty-six dismissed, as will appear by consulting the first and second tables appended to the work. Forty-two medicines have been added to the primary, and thirteen to the secondary list. It will be noticed that among the introduced articles a considerable number have not taken the usual course of promotion, but recommended, either by later authority than that of the previous revision, or from long unofficinal employment and the convenience of substitution, have been thought worthy of being made officinal. Chromic acid, canna, chiretta, yeast, ignatia, leptandra, carbonate of lithia, matico, pumpkin-seed, sulphate of manganese, molasses under the name Syrupus Fuscus, whiskey designated as Spiritus Frumenti, and a few others have been introduced, *de novo*, on the ground of strong testimony in their favour as remedial agents, while to others, again, as lactic acid, amylic alcohol, glacial phosphoric acid, stronger alcohol, orange flowers, belladonna root, commercial chloroform, gutta percha, &c., prominence has been given from the part they play in the formation of important preparations. Among the new articles of the secondary list will be found koosso, wahoo, yellow jessamine, cotton root, and kamala.

From the primary list thirteen articles have been dismissed, and a similar number from the secondary. The term Cinchona, as applied in a generic sense, has been discarded; and it will be found that the three varieties of pale, yellow, and red are alone authorized. There is much that can be said for and against this alteration in the mode of designating cinchona bark. So far as certainty can be secured by designating a specific variety of bark, to be used by the apothecary, the present limitation to the three mentioned will be useful; but there are other kinds which are of great importance, which are by this course not recognized as officinal, and which formerly were embraced under a general head as Cinchona. These are employed largely by the manufacturer, and it is not intended to preclude their use in medicine. Very inferior kinds, however, would be interpreted to be included under so general a term, and it is to preclude their substitution for the most valuable kinds that the present step has been taken; perhaps it is the wisest plan in order to obviate imposition. Most of the articles in both the lists which have been dismissed are intrinsically of little importance, or have given place to better forms of the same medicines. Lemon has been replaced by lemon-juice, and amber is not used in the shop, as the oil is made by the manufacturer, and has taken its place by the side of other articles.

In this connection it may be proper to state that such medicines, as by the subdivision of labour are now furnished by the manufacturer, are enumerated in the list of them, having been transferred from the preparations. Five articles are thus treated, and as all must admit who are engaged in the dispensation, judiciously.

In connection with an exposition of reliable lists of medicines their nomenclature is an important consideration, and this is based for the most part upon the language of the sciences pertaining to the source from which the articles are respectively derived. It is essential that the nomenclature employed should be brief, clear, and at the same time expressive; and while it is admitted that perfection cannot be attained in this somewhat changing particular, still it may be stated that the authors of the first Pharmacopœia strived diligently to attain this. It would be convenient, in this essential feature, if all analogous works in the English language presented uniformity; but the colleges of the British Empire have never conformed to the same principles with respect to nomenclature, and the authors of our work were therefore forced into the adoption of an independent method, embracing as far as possible the merits of all, with, it must be admitted, their own improvements. Aided by a better understanding of the views of each other, from inter-communication of pharmaceutical knowledge, there is no doubt that when the single British Pharmacopœia makes its appearance, a greater uniformity will be observable between it and our own with respect to nomenclature. The changes which are noticeable in the new revision are either general, involving a principle; or they are particular, pertaining simply to the change of name. The singular number has been adopted in the place of the plural: thus Folium has been substituted for Folia, in association with aconite, belladonna, &c.; and this applies not only to the Latin, but as far as practicable to the English names: thus almond is used for almonds, cubeb for cubebs, fig for figs, nutgall for galls, &c. Where several varieties of an article were formerly placed under a single name, this has been dropped and the special kinds designated: thus Aloe has been dropped and Aloe Barbadensis, Aloe Capensis, Aloe Socotrina, introduced in the place of it. The generic name of the plant has always been assumed for the medicine where only one species is employed, while if several were used the specific names designated the varieties of the medicine. In reducing the varieties to a single one this rule has been exemplified: thus it has not been deemed essential to designate all the species of Erigeron, and that name has been made to subserve the purpose, so also with Asclepias and Rubus. An exception occurs in the case of Ulmus, which has been altered to Ulmus Fulva. On the contrary, the generic name has been broken up, as it were, into specific names, where these are more definite with reference to the article, as in the case of Sinapis, which has given place to Sinapis Alba and Sinapis Nigra. Where again only one portion of a plant is retained as efficient, the generic name is solely used instead of the portion of it: thus Althæa replaces Althææ Radix; Conium is used for Conii Folia. Some names have been entirely altered, as, for instance, Calumba is substituted for Colomba, Vinum Xericum for Vinum Album, and Vinum Portense for Vinum Rubrum.

Alteration of nomenclature is not confined to the lists of medicines; it is found in the preparations also. The termination uretum, except in sulphuretum, has been altered to idum, which gives the new titles "cyanidum" and "ferrocyanidum." Antimonii Sulphuretum Præcipitatum has been changed to Antimonium Sulphuratum, in consequence of the want of precision in the ingredients of the compound. Ferrum now comprises all forms of pure iron, and the time-honoured and time-sanctioned Dover's powder has been altered from Pulv. Ipecac. et Opii to Pulvis Ipecacuanhæ Compositus. As the Spiritus Ætheris Nitrici does not contain nitric acid, but the nitrous acid of the new arrangement of the compounds of nitrogen

and oxygen, it is now most satisfactorily denominated Spiritus Ætheris Nitrosi. Another change of name to which allusion ought to be made is of the iodide of mercury to green iodide of mercury. With respect to the names of salines the gender has been changed from masculine to feminine, "as conforming to the best latinity;" and hence, when adjectives are used in connection with them, a corresponding change of the name is exhibited: thus Argenti Nitras Fusus is converted into Argenti Nitras Fusa, &c. This alteration has been long called for by those whose classical nicety was offended in previous editions.

There is another circumstance to be noticed before dismissing this topic of alterations in nomenclature. There existed a series of English names, handed down from time immemorial, derived from vulgar sources, which in reality had no other merit than their habitual employment, and yet without accomplishing any definite purpose, while at the same time many officinal names were made to indicate the same substance as well in English as in Latin. This latter practice has been extended, and it is questionable whether the whole collection of English vulgar names might not have been profitably dispensed with. Angustura and Cascarilla well express the substances to which they are applied; to which have now been added Arnica instead of leopardsbane, Calamus for sweet flag, Digitalis for foxglove, &c. By this method we are freed from the synonomy and homonomy, which have been the bane of nomenclature, and which have led the public to think erroneously that prescriptions should be written in the vernacular, without comprehending that the full adoption of the language of science in the place of the vernacular affords greater safety to the community.

The next object of a pharmacopœia is to present the best forms for the administration of medicines, and in connection with them the most approved formulæ for securing efficiency in the officinal preparations. The alphabetical arrangement has been followed in grouping the preparations, which upon the whole has the advantage of simplicity and convenience, and to some extent admits of scientific order. In every case of a metal or chemical substance, this, however, does not permit all of its preparations being placed under the general head; thus, for instance, the tincture of the chloride of iron, instead of being placed under the head of Ferrum, has necessarily to be separated and placed among the tinctures. A greater observance of the alphabetical arrangement in the classes will indeed be observed in this edition than heretofore: thus the tinctures of iodine may be further cited as being found, not under iodine, but in the class mentioned along with such as are prepared from vegetable substances. A similar transposition will be discovered in Liquores and other classes. Had a more strictly scientific plan been adopted it would have been impossible to avoid all incongruity.

In table third a list is given of the new preparations that have been introduced, which amount to the large number of *one hundred and eleven.* They are to be found throughout the book under their appropriate headings. Many of these medicines have been thought to present better forms for administration than some from the same article of the materia medica long employed, while others again are so clearly improvements as to induce a substitution of them for former preparations. Under the title of Iron will be found chloride, citrate of iron and ammonia, sulphate of iron and ammonia, tartrate of iron and ammonia, citrate of iron and quinia, lactate of iron, pyrophosphate of iron and dried sulphate of iron, while under the head of Liquores will be noticed the solution of the citrate of

iron, solution of subsulphate of iron, and solution of tersulphate of iron, all being novel in this revision, and with the old retained preparations of this metal, affording infinite latitude of selection. One may, in fact, conclude either that physicians have not lost faith in this article, or that the age of iron has come again. The iodide of iron has been dismissed in consequence of the difficulty of preserving it, and for the solution of the same the syrup has been substituted, as the chemical character is best retained in this form.

Among the other preparations made officinal, may be observed purified aloes, valerianate of ammonia, atropia and its sulphate, sulphate of cadmium, sulphate of cinchonia, valerianate of quinia, and valerianate of zinc. Some more of the new preparations we shall have occasion to comment on when giving a cursory view of the modifications connected with the classes themselves. The preparations dismissed amount in all to thirty-seven; many of them have become obsolete, while others have been replaced by better. Prepared calamine has been removed in consequence of the universally sophisticated nature of the article supplied by commerce, and the precipitated carbonate of zinc directed in its place, the Ceratum Calaminæ as a consequence has fallen with it. The pulp of purging cassia is not needed, as the fruit itself is directed in the confection of senna. Infusion of sarsaparilla is not required, and the above reasons may be given with respect to the entire list.

The classes of preparations, it will be perceived, have been remodelled; this has been called for by the number of the preparations introduced, and thought to be expedient in interpolating them with the old. A necessity for change has also been entailed in consequence of the adoption of some new principles of grouping. As this feature of the work may give rise to some embarrassment, it will be well to dwell sufficiently upon it. Each class is designated by the name of the preparation, latinized, in the plural, according to the usual system, or by the name of the substance constituting the preparation and its combinations, or by the name of the substance which is the basis of all the preparations included under it. Hence we have Aceta, Æthera, Aquæ, Decocta, Emplastræ, Extracta, &c., as classes, but we have Aloe, Ammonia, Atropia, Carbo, Collodium, Morphia, Quinia, Strychnia, &c., also as classes. The remainder of them are designated by the name of the metal to which they belong, and under such designation come not only saline bodies of the metals proper, but the alkalies and their combinations; thus under the class Hydrargyrum will be found the preparations of mercury, while under those of Sodium and Potassium will be discovered the salts of soda and potassa; such simplicity of arrangement has only been possible in these latter times, and certainly is remarkable as an evidence of the advance and precision of chemical science. In the name of the classes an alteration has been made in a number of instances, thus, Aquæ Medicatæ is replaced by Aquæ, and Vina Medicata by Vina, and Carbo Animalis by Carbo, Collodium has been made a class, and the class Liquores is peculiar to this revision. In the former editions Liquores or solutions were placed under the head of each substance which they represented, but as they have attained some number, there exists no reason why they should not be collected and made to represent a class. This alteration has been made upon the principle of presenting in the form of aqueous solution fixed bodies, all of chemical origin, while the class of Aquæ embraces solutions of volatile matter. To follow this rule it was necessary to call Aquæ Calcis, Liquor

Calcis, while Liquor Ammoniæ has been again placed under the designation of Aqua, from which, in our opinion, it should never have been taken. One anomaly exists in the class of liquores, which is that of Liquor Guttæ Perchæ, a solution of the substance in chloroform.

Two other classes are new to this revision, viz., Oleo-resinæ and Resinæ. As stated in the preface, these "have well defined characters, and their introduction will meet with general approval. The oleo-resins were formerly confounded with the fluid extracts; of the five that are given, those of capsicum, lupulin, and ginger, are newly introduced. "The three resins, those namely of jalap, may-apple, and scammony, appear in the Pharmacopœia for the first time."

A remarkable peculiarity of the work is the great increase of the class of fluid extracts. It would appear as if fashion had exerted its influence in this direction, still there is much that can be said in their favour, the smallness of the dose that can be given, from concentration of the active elements, and their convenience of employment in the place of other preparations, as well as for combination in prescriptions, render their possession highly important. There was nothing more difficult in past times than the administration of cimicifuga; the fluid extract of it now subserves the best purpose. The old fashioned infusion of senna may be dispensed with, and the fluid extract used for all its objects. In the case of ipecacuanha, the fluid extract will be found more effective than any other article. Another article to which we may refer, is the fluid extract of colchicum seed and of the root. Nineteen pages of the book are given to these preparations, on which is recorded the method of forming twenty-five of them. Alcohol, or diluted alcohol, is the menstruum used in all of them, and to a few a small quantity of acetic acid is added. The menstrum used in the oleo-resins is ether, which serves likewise as a mode of distinction between them and the fluid extracts.

In the alterations that have been made, some old and familiar preparations will be discovered under new titles. Thus it may be thought that soap liniment has been forgotten, yet it will be found not as Tinctura Saponis Camphorata, but as Linimentum Saponis, among the liniments; Unguentum Simplex is now Unguentum Adipis, and Ceratum Simplex is Ceratum Adipis. It should be observed that the Liquor Potassæ Citratis has been renamed Mistura Potassæ Citratis, which comports better with the common name neutral mixture. Under the head of spirits and tinctures there have been made several, as we conceive, judicious transpositions. Thus, the awkward designation of Tinctura Olii Menthæ Piperitæ, has been changed to Spiritus Menthæ Piperitæ, and so of Menthæ Viridis. It may be stated here that the elegant Spiritus Ammoniæ Aromaticus has been transferred to the class of Spiritus. Bay rum will also be found as a new preparation in the primary list, under the title of Spiritus Myrciæ, from the name of the myrtle plant from which distilled, the Myrcia Acris. In explanation of some of the alterations in the English names of preparations, it is stated that two plans were originally adopted in designating the cerates, liniments, mixtures, pills, plasters, and ointments:—

"Sometimes the initial word of the officinal title is the name of the chief substance present in the preparation; at other times it is the name of the class to which it belongs. Thus the Pharmacopœia of 1850, has camphor liniment and liniment of turpentine, ammoniac plaster and plaster of ammoniac with mercury, stramonium ointment, and ointment of belladonna, sulphur ointment and ointment of iodine, &c. In cases like these the committee have preferred

the nomenclature which gives precedence to the name of the class to which the preparation belongs, and accordingly they have made forty changes of this kind. The rule, however, was not made absolute, but exceptions were admitted in a few cases in which the present names have been settled by so long usage as to make it inexpedient to change them."

While new classes have been made, containing, perchance, but a single preparation which has given rise to it, others formerly containing but one have been enlarged; thus under the denomination of Bismuthum we find the subcarbonate added to the subnitrate, under Strychnia, the sulphate has been introduced, under Aluminium dried alum and the sulphate of alumina, while alum itself has been transferred to the primary list as a manufactured commercial article. Collodium having been removed from the ethers, has been made the type of a class containing it and collodion with cantharides.

The alterations made in the formulæ must now occupy a portion of our attention. The Acetum Opii has been slightly altered in composition. According to the old formula, it contained $73\frac{1}{3}$ grains of opium to the fluidounce; it is now directed to contain 75 grains, which is exactly twice the strength of laudanum. The tinctures of opium in the former revision have been left undisturbed, but a new one has been made officinal under the name of Tinctura Opii Deodorata. It is to a certain extent a reproduction of the denarcotized laudanum. The difference, however, consists in the formation, in the first instance, of an aqueous extract, separating from this the narcotina by means of ether, and then by the addition of the proper amount of water and alcohol producing a diluted tincture. It is intended as a substitute for the nostrums now in the market. It will be observed that diluted hydriodic, diluted nitromuriatic, diluted phosphoric, and sulphurous acids are new preparations, the formulæ for which have been carefully prepared. The object of introducing commercial chloroform into the primary list of the materia medica was to direct attention to the difference between it and the purified article, which alone should be used for medicinal purposes. Under the designation of Chloroformum Purificatum which is the same as Chloroformum of the revision of 1850, a formula is given for the preparation from the common commercial article. This is so important a subject that sufficient stress can hardly be laid upon it. A formula is given for the Extractum Ignatiæ. This preparation has of late years become exceedingly popular with physicians, but made from no definite formula. It is now presented in a reliable form as a substitute for the extract of nux vomica, from which it differs in containing more largely of brucia. It will be noticed that a new process has been adopted for the formation of the subnitrate of bismuth. The carbonate has been introduced, but it is prepared previously to the production of the present preparation, and used in its formation. The object of this process is to avoid the adulteration or presence of arsenic, which has in certain cases complicated the attempt to determine the source of arsenic found in the stomach, a subject some years since brought before the notice of the College of Physicians of Philadelphia, by Prof. R. E. Rogers, and which has attracted attention abroad. In the confection of senna it will be seen that the liquorice root has been discarded, while some little alteration has been admitted with respect to the other ingredients.

The tartrate of antimony and potassa is directed to be prepared by an entirely different process from that formerly used. A pure oxide of antimony is in the first place prepared and substituted for the oxychloride hitherto directed. This has also been introduced as an officinal preparation. To

prepare the oxide, the precipitate of the oxychloride is formed in the usual way, but subsequently washed with water of ammonia. The object of this alteration of the process is to give a purer, and at the same time, as directed by the Pharmacopœia, a more economical product. Under the class Mellita is given a formula for Mel Boracis, which is a convenient preparation; and among the Pills will be found the formula for Plummer's pills under the designation of Pilulæ Antimonii Compositæ. With respect to syrups it will be perceived that some useful modifications have been adopted. The simple syrup formula has been remodelled and a slightly weaker preparation formed, which renders it, if any change is effected, less liable to candy. Distilled water is directed and the process improved.

A substitution has been made of the Tinctura Cardamomi Composita for the Tinct. Cinnamomi Composita, which is an admirable change, the former preparation, not heretofore officinal, being a more elegant one, and both not being wanted. Under the class Unguenta, ointment of benzoin has been adopted. It is simply lard flavoured with the volatile ingredients of benzoin, and affords an aromatic basis for compound ointments extemporaneously directed. There has always been complaint with respect to the irritating nature of gall ointment, from the difficulty of reducing the nutgall to a sufficiently fine powder; as a substitute in case of irritable piles the ointment of tannic acid may be used, which has additionally been made officinal. Tobacco ointment has a better formula than in the old revision. It is made with a watery extract of the drug. We may in concluding our remarks upon the preparations, advert to an error to be found in the formula for wine of ergot. Instead of the two troy ounces in it, four should have been directed: this is an inadvertence that can be corrected in the stereotype plates very readily.

We must now pass to the remaining points to complete our notice; and the first to which attention may be directed, intimately connected with the formulæ for the preparations, is Weights and Measures. The question, which system of weights is most appropriate for a Pharmacopœia, is a *quæstio vexata*. In England it appears to have given rise to much perplexity. The Dublin College has adopted the avoirdupois weight, but as it is understood, this system, after finding favour with the framers of the *New British Pharmacopœia*, has been discarded in consequence of the outside pressure that has been brought to bear against it. There is no doubt of the advantage of having but one set of weights, both for buying and selling, and for medicinal preparations. Yet in England and this country custom has so irradically sanctioned two that it is important to diminish the evil as far as possible. The main difficulty is to abolish the avoirdupois from the shop of the apothecary, who has the advantage of the lighter ounce pertaining to it in his sales, while inadvertently or by design this may be used in the preparations. To obviate this latter contingency all intermediate weights between troy grains and troy ounces have been discarded, and to bring constantly before the mind of the apothecary the fact that troy weight is intended, the term troy is used as the prefix to the words ounces and grains. There is here no obscurity, and the avoirdupois ounce cannot be honestly resorted to. It is singular that full sets of the troy weights are rarely kept in the shops, and above the drachm, cannot be found. As they can readily be procured in accordance with government standards, for this there is no excuse. With respect to this point we are told by the committee that the subject was a perplexing one.

"The final conclusion come to as to weights was to use exclusively in the formulas the grain and the troy ounce, the latter always printed troyounce, as one word. The term *pound* has been disused in them, in order to avoid the liability to mistakes from confounding the troy and avoirdupois pound; and the new word *troyounce* distinctly indicates a weight of four hundred and eighty grains, which cannot be replaced by the avoirdupois ounce through ignorance. Wine measure, as heretofore, is employed in all the formulas; the only change being the disuse of the term gallon, which measure, whenever it occurs in the Pharmacopœia of 1850, is expressed in pints. The adoption of imperial measure would have secured the advantages of uniformity with the liquid measure used throughout the British empire; but so long as the United States continue to legalize the wine measure, it is proper that physicians and apothecaries should conform to it."

Further, under the head of Preliminary Notices some directions are given which should not be overlooked. Thus, by gentle heat is meant any temperature between 90 and 100°; and when the specific gravity is mentioned the temperature assumed is 60°. The exact designation of the term saturation, and the direction for stoppage of bottles should be attended to. The specifications for *percolation* and the *process of displacement* have been rewritten. The difficulties which invest this mode of exhausting substances of their active principles, must be removed by the plain directions which are there given, and as this mode is more universally employed than previously, it must be completely comprehended to render it available. In connection with displacement it is proper to state that when the word "macerate" is employed, it means simply to soak or steep, without any reference to temperature; and when the word "digest" is used, it means in connection with soaking, the maintenance of a temperature from 150 to 200° Fahr.

Precision has also been introduced with respect to the "Fineness of Powders." "For this purpose the terms very fine, fine, moderately fine, moderately coarse, and coarse, are used—the powder passed through a sieve of eighty or more meshes to the linear inch, being designated as—*very fine*, through one of sixty meshes *fine*, through one of fifty meshes *moderately fine*, through one of forty meshes *moderately coarse*, and through one of twenty meshes *coarse*. For the convenience of apothecaries, sieves so constructed and labelled might be introduced, and the above terms thus stamped upon the minds of all manipulators in medicinal articles.

A point ought to be adverted to which has been considered of some importance by pharmaceutists. It is the accentuation of the Latin pharmaceutical names, which will be found in the index.

We here close our somewhat lengthy review of the revision of the United States Pharmacopœia of 1860. First and last, at least five years have been occupied by the various societies who have contributed to it, and by the Committee of Publication. That every pains has been taken to render it worthy of the scientific bodies engaged upon it, and of the nation, there can be no doubt. It has cost much labour, research, and reflection, and in the same spirit with which the work has been executed must it be criticized. The motto which might have been appropriately adopted for the title page, and which would have a prospective signification with reference to the next revision, is

"Si quid novisti rectius istis
Candidus imperti; si non his utere mecum."

J. C.

ART XIV.—*A Clinical Treatise on Diseases of the Liver.* By Dr. FRIED. THEOD. FRERICHS, Professor of Clinical Medicine, formerly in the University of Breslau, and now in the University of Berlin, etc. etc. Translated by CHARLES MURCHISON, M. D., Fellow of the Royal College of Physicians, London, Assistant Physician to King's College Hospital, and to the London Fever Hospital. The New Sydenham Society, London, 1860. 2 vols. 8vo., pp. 402 and 584.

THE student of psychology, of the operation and results of our faculties when trying to find out how the Creator produces results in this material universe, will find a great deal of interest in the historical introduction to this clinical treatise on diseases of the liver. Seventeen hundred years ago, Galen gave a very complete account of the organization and functions of the liver, which was generally received and scarcely at all modified for fifteen hundred years. He regarded the liver as a blood-making organ, described the metamorphosis of the blood as commencing in the portal veins, and completed in the liver. The discovery of the lacteal vessels, in 1622, and of the thoracic duct, in 1647, of canals by which the assimilated juices contained in the digestive cavities could be conveyed to the blood-vessels and mixed with blood, seemed to place the liver out of the way of the process of sanguification. The function of the veins to take up the juices recently introduced into the economy or resulting from the disintegration of tissues, was transferred to lacteals and lymphatics. The portal vein carried blood from organs of digestion, which was purified by the excretion of the bile and then sent to the lungs. The liver was then regarded as an organ of excretion. Harvey's discoveries of the circulation of the blood confirmed these views, and those who tried to uphold the former views were but few and but little regarded. These opinions prevailed for nearly two hundred years. Our author quotes Boerhaave's observation, "Dudum in meliori partre Europæ (obsolevit), hæc sanguificatio nunquam ab eo viscere expectanda." Magendie, Tiedemann, and Gmelin, physiologists of this century, proved that their immediate predecessors were mistaken, and that the ancients were right in regarding the liver as playing an important part in the manufacture of blood, and in the assimilation of matters taken into the digestive cavity. Galen's views, modified and circumscribed, were re-established. Blondlot, Claude Bernard, Lehmann, Schmidt, and Ludwig, have made the liver an especial object of experiment and study. They have proved that water, salts, sugar, odoriferous and colouring matters get to the blood through the veins, whilst the greatest part of the fat passes into the lacteals. Other observers, as Reichert, Weber, Kölliker, are trying to find out what is done by this organ to the corpuscles of the blood, what part is taken in manufacturing them. Bernard, feeding animals on nitrogenous food, found sugar in the hepatic veins, and attributes to the organ a function of sugar-making; and though by subsequent observers the work of the organ is regarded as ceasing with preparing a substance easily transformed into sugar, but more particularly destined for the manufacture of fat, yet the importance of the organ in secretion as well as in excretion is none the less established. That the complex atoms of the albuminous principles undergo other changes in the liver has also been shown, and Claude Bernard sustains Galen's views of the important work done by the organ in the manufacture of animal heat. In the last number

of this journal for the last year, there were published most important experimental researches into a "new excretory function of the liver," in which the office of the organ in purifying the blood is more clearly defined, and the bile is shown to be a compound fluid containing cholesterine taken up out of the blood where its presence is injurious, as well as recrementitious salts, the glycocholate and taurocholate of soda, which are manufactured by the liver itself, and are concerned in processes of assimilation. Thus are the functions of the liver being ascertained and defined. The idea of the organ being concerned in assimilation and nutrition, dates back to the days of Hippocrates and Galen, and yet within this last year, Dr. Austin Flint, Jr., has made important contributions to the establishment of these views. His two propositions are: "First, that the bile contains the glycocholate and taurocholate of soda, which are not found in the blood; are manufactured in the liver; are discharged mainly at a certain stage of the digestive process; are destined to assist in some of the nutritive processes; are not discharged from the body, and, in fine, are products of secretion; and, secondly, that the bile also contains cholesterine, which is found in the blood; is merely separated from it by the liver, and not manufactured in this organ; is not destined to assist in any of the nutritive processes, but merely represented to be discharged from the body, and is a product of excretion." Thus do we surmise and conjecture at truth; thus is it mixed up with errors, and so slow is the process of proving, settling, and separating. Dr. Flint tells us that the physiological history of the bile remains to be written. Is it not noticeable that so large and so important an organ of the body should be so imperfectly known and described, when it has been the object of study and research for so many hundred years?

Now, this fact, that the anatomy and physiology of the liver are still so imperfectly known, must be borne in mind when we examine a clinical treatise on diseases of the organ. Pathology is dependent on anatomy and physiology, and advances *pari passu* with the other sciences. In a *clinical* treatise we look for sound pathological views, as well as for a record of details observed at the bedside and in the autopsy room. The anatomy of the liver is more complete and better defined than the physiology. Its vessels, its cells, its connective tissue have been carefully studied by the aid of the microscope, and accurately described. But, whilst we recognize that the organ has an important part in secretion, excretion, sanguification, metamorphosis of tissue, production of animal heat, exactly what that part is, and how much it is, remain yet to be determined. The symptomatology of the organ must then be imperfect. The digestion, the nutrition of a patient is impaired, excretion is imperfectly performed, but we cannot yet say which of the various organs concerned in these processes is in fault primarily or principally. Pathological anatomy tells us of exudation of lymph, blood, and pus in the organ, it describes results of inflammation, it shows the exudation of cancer and tubercle, it tells of fatty and pigmentary degeneration, of hypertrophy and of atrophy, but the symptomatology, etiology, and therapeutics, in connection with these various lesions, are very obscure, uncertain, and imperfect.

A scientific work on the pathology of the liver is an impossibility in the present state of our knowledge. We must be very thankful for the clinical treatise of Dr. Frerichs, for which he claims that scientific medicine constitutes its groundwork. He tells us also that in the plan of his work he has had anatomy and physiology less in view than medical practice. The more important diseases of the liver are treated of in the second volume; those which

would first be considered had we the means of making a truly scientific treatise. There was an interval of two years between the publication of the first and that of the second volume. The first chapter of the first volume is occupied with a historical introduction; in the second chapter we have the size and weight of the organ in health and disease, whilst in the following chapter the diagnostic value of abnormal sizes and forms of the liver is ably discussed. There is a great deal of interesting matter in these two chapters, but we will proceed to the next, where, in a hundred and twenty octavo pages, the subject of jaundice is brought before us in several sections, the first of which is devoted to a historical account, and the second to the theory of the affection. The yellow tinging of the skin, and of several of the secretions by bile pigment, is the only attempt we find at a definition of the term. Of the sixteen ingredients which chemists find in the bile, biliverdine or colouring matter is the most recognizable to the unaided sight. We may admit that it is manufactured by the liver out of the colouring matter of the blood; and that, when this work is not done by the liver, the skin, the conjunctiva, and the renal secretions become the recipients of the pigment. But whilst this colouring matter is the most easily recognized ingredient of the bile, it does not compose that fluid, nor can we regard it as the most important ingredient. We must admit that in some cases other functions of the organ are performed, when the skin is yellow, and, that in other cases, with a skin, a conjunctiva, and a renal secretion of the normal colour, we have reason to believe that the patient is suffering from failure of the liver to perform the office of secretion and sanguification. Dr. Flint's researches come to our aid here, and we miss in Dr. Frerichs' treatise that distinct recognition of the different ingredients of the bile as both a recrementitious and excrementitious fluid, so clearly set forth by Dr. Flint in his admirable paper. Thus, we read in his treatise, that

"Jaundice from reabsorption forms the sure starting-point for further pathological inquiry, and in all cases and forms of the affection where it is practicable, the main question is to search for mechanical obstructions preventing the escape of the bile, or for other causes of the passage of this fluid into the blood. It is only when this is impossible that we can consider other theories of which a positive confirmation has hitherto been impossible, and the main value of which consists in the necessity for some hypothesis for explaining our observations. In such cases can we ascribe the jaundice to an accumulation of bile in the blood owing to something which interferes with its secretion, or are we to adopt the theory of a direct crumbling down of the blood-corpuscles or red matter of the blood into bile pigment?

"The production of jaundice from an imperfection in the secreting functions of the liver, which Budd and Bamberger have spoken of in recent times, without, however, bringing forward any striking proofs of the assertion, is opposed by too many well-established facts for us to support it. All the means for detecting traces of the essential elements of the bile in the blood generally, and in that of the portal vein in particular, have been exhausted without any result; neither the colouring matter, nor the acids of the bile, substances for which we possess tests of considerable delicacy, have been found.

"In the same way that urea accumulates in large quantities in the blood in granular degeneration of the kidneys, so ought the biliary acids and bile pigment to accumulate in the blood in cases of granular liver."

Now, Dr. Flint maintains, and, as we think, successfully, that cholesterine is the ingredient of the bile corresponding to the urea of the urine. This pre-exists in the blood, is derived from the disintegration of nervous tissue. The glycocholate and taurocholate of soda are manufactured by the liver, do not pre-exist in the blood, are never found in it under any

circumstances. They subserve for assimilation, and, when they are not secreted, assimilation will be defective. But when cholesterine is not excreted then poisonous matter accumulates in the blood, as urea accumulates with suppression of urine; and, whilst a certain amount of these substances in the blood is consistent with health, a greater amount is pernicious, and a still greater amount deadly. Now neither is cholesterine nor are the salts of the bile identical with its colouring matter, any more than urea is identical with the colouring matter of the urine. And we do not yet understand the relations they sustain to each other. In some cases of jaundice we do not detect symptoms of a deficiency in the secretion or the excretion of the liver. The assimilation is not defective, there is no evidence of cholesteræmia; whilst, in other cases, digestion is imperfect and the nervous system is oppressed by a poison. Nor can we distinctly connect the different anatomical conditions of the liver with a failure in its functions.

Dr. Frerichs has done well in taking up jaundice at the outset of his researches, because our knowledge of the organ is so imperfect. There are certain lesions, obstructions of the bile ducts, which interfere with the bile being discharged into the intestinal cavity, containing the assimilative juices and the seat of digestion, as well as a canal with a capacious outlet from which refuse, superfluous and poisonous matter escapes from the body. In these cases the cells and canals of the liver may hold for a while the excretion, or it may be absorbed into the body and removed by the skin, the kidneys and other excreting organs. We find cholesterine in the blood, brain, nerves, crystalline lens, meconium, in the fluid of hydrocele, and of ovarian cysts, in crude tubercle, in cancer, in epithelial tumours, in pus as well as in the bile and in the liver. The passage of this substance from the liver into the intestinal canal may be prevented for some little time, and nature can dispose of it in other ways, life being continued. Still, these arrangements are but temporary and incomplete; the patient suffers and finally dies. But the patient also suffers and dies where there is no obstruction to the ducts. The liver must be properly supplied with blood of the right kind and with nervous power to perform its functions of secretion, excretion, sanguification and assimilation. We have jaundice from pyæmia, from typhus, from yellow fever, from bilious fevers; we have epidemic jaundice. The word itself, so much associated with the presence of the colouring matter in the skin, expressive of and leading to a consideration of the failure of the liver to perform only one of its many functions, is unfortunate.

Dr. Frerichs' fifth chapter is on acholia, suppression of the functions of the liver, but has he a right to use these terms as synonymous? The secretion of the bile is one function of the liver, and if we distinguish this fluid as both excrementitious and secrementitious, as subservient to processes of assimilation of the food as well as to purification of the blood, and if we ascertain and recognize exactly how in the formation of this fluid the liver's share in sanguification, in animal heat is performed, then we may find that acholia, a non-secretion of bile, is identical with a suppression of the functions of the liver. We certainly seem now to be in the way of analyzing these complicated functions. There are many physiologists engaged in this study, and many pathologists are recording and analyzing cases where structural changes in the liver were found after death. In Dr. Frerichs' article on jaundice from snake-bites, he mentions the theory of older physicians, that this form of jaundice is owing to a spasm of the bile ducts, and he refers to that of Fontana, a liquefaction of the bile resulting from putrid decomposition, neither of

which are supported by recent observation. He calls attention to Bernard's experiments on the action of curare, which gives rise to congestion of the liver and to the excretion of sugar in the urine. And it must be in the same way that the poison of yellow fever gives rise to jaundice, acting on the nervous system, which presides over the circulation, and thus interfering with secretion and excretion. A change of colour of the organ, a fatty condition, have been noted by pathological anatomists; we may admit hyperæmia to have been present, but we have no evidences of nor can we believe in important modifications of structure as occurring in so short a disease. How far, then, is the fatal result to be attributed to what Dr. Flint calls cholesteræmia, to the non-performance by the liver of its function of excretion? The black vomit in this disease is now attributed to uræmia. The circulation in the kidneys is disturbed, they do not remove the urea from the blood, the glandular system of the stomach undertakes this office, but, so great is the congestion, that the distended vessels relieve themselves of their contents, blood is poured into the digestive canal, mixed with its juices, and then is vomited. Suppression of urine is given as a most unfavourable symptom in this disease. Thus we seem to know more of the effect of the poison of yellow fever in interfering with the renal than with the hepatic function, whilst in the description of its lesions, the condition of the liver is more conspicuous than that of the kidney. And we need information of the effect of other poisons. Jaundice is a symptom of relapsing fever, given as a diagnostic symptom, and yet we sometimes have a yellow skin in typhus and typhoid fevers. This question may be asked, how far are those symptoms called typhous, nervous prostration, weakness, unconsciousness, to be attributed to the liver ceasing to excrete; or how far from the poison acting directly on the nervous centres of circulation and nutrition? Cholesterine seems to result from the disintegration of nerve-substance, connected with an active function; and we want a quantitative analysis of the blood and feces in patients dying in a typhous condition, to aid in the answer to these questions. Dr. Flint does not find cholesterine in feces. It becomes changed into stercorine, which, like cholesterine, is a non-saponifiable fat. Ten and a half grains were found in seven and a half ounces of feces, the dejection of a healthy male; but, this quantity varies, and we do not yet know the correspondence between the amount of cholesterine in the blood and of stercorine in the feces. Dr. Flint gives the following table to show the correspondence in the amount of cholesterine contained in the bile and the amount of stercorine discharged in the feces:—

Quantity of bile in the 24 hours . . .	16.940 grains.
" cholesterine at 0.618 pts. per 1000	10.469
" stercorine discharged . . .	10.417

The difference here between the amount of cholesterine and of stercorine is only a little more than five per cent. of a grain. Now, we want more analyses of this kind, as well as analyses of the blood for cholesterine in patients with these different fevers, and in different forms of these fevers. Cholesterine instead of stercorine should be expected in the feces of patients where digestion is suspended, as the change from one substance to the other seems to be connected with the performance of this function. In hybernation the feces contain cholesterine and little or no stercorine.

We have dwelt on these researches of Dr. Flint to show how much light is thus thrown upon those cases where the liver does not perform its functions as an excreting organ, since the publication of Dr. Frerichs' work.

He did not distinguish between the excretion and secretion of the bile; he looks too much to the presence or absence of the colouring matter of this fluid in other parts, as the evidence that the liver is or is not performing its various functions. Still, his remarks may be read with interest and profit, and he has collected what was known, and has recorded observations of his own in such a way as to constitute an important advance in pathology.

His article on acholia is followed by and connected with those on acute and chronic atrophy of the liver. Here we have a most efficient and intelligible cause of jaundice. If the nutrition of an organ fails, if its secreting and excreting cells disappear, its functions must cease. Five cases are recorded in which atrophy of the liver was found after death, and these are called illustrative cases; and then follows an analysis of symptoms made from thirty-one cases, the only ones to be found which could be considered reliable and regarded as cases of acute atrophy. The account thus made out is not very satisfactory, but the fault is not so much with Dr. Frerichs, as with the insufficient means at his disposal. In these cases other organs were diseased. Atrophy is a general disease, and when one organ or tissue is conspicuously its seat, others are generally affected by it. So we get symptoms from the failure of several organs to discharge their functions, and we cannot yet assign to each its part in the symptoms. Thus we are told of premonitory symptoms in half of the cases consisting of those derangements which

"are met with in acute catarrh of the stomach and bowels, occasionally of rheumatic affections; upon these symptoms jaundice supervened, which in its characters was in no way distinguishable from simple jaundice. In most cases the duration of these premonitory symptoms amounted to from three to five days, but in many cases to from two to three weeks and upwards."

Certainly, in these symptoms there is nothing diagnostic. The skin was invariably jaundiced, its temperature elevated only during the premonitory febrile stage, and afterwards for a short period in the stage of great nervous excitement. It is the seat of hemorrhages, as are various parts of the body.

"The heart's action presents great variations, and in connection only with oscillations in the heart's action, are there abnormal respiratory motions, and does the breathing become sighing or stertorous."

The organs of digestion always undergo important functional changes, abdominal pains being among the most important symptoms; changes in the volume of the liver and spleen, and repeated vomiting, obstinate constipation being also noticeable.

"There are remarkable variations in the composition of the urine, indicating the existence of deeply important, although long unrecognized abnormal states of the metamorphosis of matter, and they furnish (provided further observations shall, as I have no doubt, show them to be of constant occurrence) no small insight into the transformations which take place in the albuminous principles in cases where the functions of the liver are arrested."

Here we may ask, are these symptoms from the kidneys due to a deficiency in their nutrition from the assimilating functions of the liver being suspended, or from the causes of disease of the liver acting on the kidneys and interfering with the functions of these organs? Abnormal conditions of the nervous system have been observed in every case as essential and characteristic symptoms. Thus the especial dependence of the nervous system on the liver is clearly manifested. From whatever cause its functions are interfered with, the nervous system suffers. A healthy blood is neces-

sary to the proper performance of its functions. If the kidneys do not excrete the urea we have headache, convulsions, coma, and other symptoms; and, if the liver does not perform its functions we may have the same symptoms. Can we distinguish between failures of these two organs by variations in these symptoms. In many cases they coexist. The causes which affect assimilation, as the poisons giving rise to the various fevers, act on both organs. Do not the causes which affect nutrition sometimes act on both, and under what circumstances is their influence limited to one? We do not find an answer to this question. We speak of Bright's disease of the kidney. We mean by this term modifications of circulation (that is, if we consider albuminous urine and dropsy, as diagnostic symptoms of the disease) as well as atrophy, granular degeneration, fatty degeneration, and the exudations of inflammation. Now we have no such one term for disease of the liver, embracing such diverse anatomical conditions of that organ. Dr. Frerichs begins with atrophy of the liver, and then goes on with fatty degeneration, pigmentary degeneration, cirrhosis, hyperæmia, and inflammation. But may not atrophy be a result of inflammation, or of fatty, or of fibrous degeneration? In these cases of acute atrophy he speaks of the glandular epithelium of the kidneys as being in most cases in a state of fatty degeneration, but he does not tell us whether in these same cases a similar degeneration had been found in the liver. There is an article on the nature of the disease, in which our author says that he hesitates to identify the destruction of the hepatic cells with fatty degeneration, whilst he is disposed to regard an exudation process as the starting point of the disease. Rokitansky, Henoch, Von Dusch refer the destruction of the hepatic cells to the action of the bile. Now, when the gall ducts are obstructed, distended, and pressure is made on the cells by retained excretion, a destructive agency is exerted, as in cases of retention of urine, when the secretory tissue of the kidneys disappears. But, an excess of elements of the bile formed in the blood of the portal vein, pervading the vascular apparatus of the liver and causing destruction of the glandular tissue by liquefaction, or an infiltration of the liver with bile from paralysis of bile ducts and lymphatic vessels, are simply theories, destitute of proof as is well shown by Frerichs.

In discussing the question, How are the symptoms which accompany the disease connected with the structural changes? our author again declares his belief of the harmlessness of the constituents of the bile, that is, in the slight importance of the excrementitious function of the liver. He dwells particularly on the

"cessation of the powerful influence which the liver exerts over the processes of metamorphosis of matter, and alludes to the formation of sugar out of albuminous substances, as a necessary link in the functional processes of the gland, and he infers from the existence of numerous other substances which have been observed, partly under normal, and partly under pathological conditions, such substances as xanthine, urea, inosite, leucine, tyrosine, cystine, that the organ is intimately related in many ways to the metamorphosis of matter."

He thus continues the discussion:—

"The important nature of these relations is shown by the remarkable changes which the urine—the general recipient of the chief ultimate products of this metamorphosis—undergoes in acute atrophy of the liver. The urea, which is the normal product of the disintegrated albuminous tissues, as we have seen, gradually disappears, and in its place a large quantity of products which are foreign to healthy urine, make their appearance. Its solid constituents consist almost exclusively of leucine and tyrosine, together with a peculiar extractive

matter; uric acid is present in tolerable quantity. It is doubtful what is the cause of the absence of urea. Is this substance really formed, although not excreted by the kidneys, or is the metamorphosis of tissue so far altered that at last no urea comes to be formed as an ultimate product? The considerable quantity of urea which is found in the blood, proves that its elimination is really stopped; still we must not conclude from this that the formation of the product takes place in a normal manner, because we have no idea, not even an approximate one, as regards the amount to which it accumulates in the blood. Thus far it must be regarded as an established fact, that acute atrophy of the liver induces very important abnormal conditions of the metamorphosis of matter, and that during its progress substances circulate in the blood which are not met with in that fluid in a healthy condition. What it is which induces the symptoms of blood poisoning is uncertain; that it is not leucine or tyrosine, is proved by injection of these substances into the blood of animals, producing no derangements of the nervous functions. It is more probable that they are due to a retention of the constituents of the urine, but this point cannot be determined without further investigation."

The reader can become convinced by a perusal of this passage, how our author, in following up one function of the liver, its part in the metamorphosis of tissue, loses sight of its excretion. The service rendered to science by Dr. Austin Flint, Jr., in his study of cholesterine, is as apparant.

Chronic atrophy of the liver is the subject of the sixth chapter; and the fatty liver that of the seventh. We are told that

"Deposits of fat in the tissue of the liver are amongst the most frequent structural changes observed in the organ. When this deposit attains to a high degree, we are wont to regard it as a disease, and to designate it by the name of fatty liver.

"All attempts to sketch an accurate history of this anatomical lesion, from clinical observations, have proved unsuccessful; fatty liver is met with so frequently on opening the dead body, and all clues to diagnosis during life are so inaccessible, that it is impossible to construct a satisfactory history of the affection. The remark, bearing upon this point, which Louis made, many years ago, in his *Recherches sur la Phthisie*, is, in many respects, still applicable: 'Nous manquons de signes capables de le faire connaître à une époque quelconque de sa durée. En vain j'ai été au devant des symptômes, qui pourraient lui appartenir, je n'en ai recueilli aucun."

Our author sets before us the normal function of the liver in the production of fat, exemplified especially in invertebrate animals and in fish, and then studies the agency of diet to modify the amount of fat of the organ. He tells us that

"It is not merely food that is unusually rich in fat that gives rise to these deposits in the liver, but, under certain circumstances, every kind of food when in too great quantity has the same effect even when it is free from fat and only contains a large quantity of the carbohydrogens. Here, however, the deposit does not make its appearance in the liver until the other organs and tissues are loaded with fat."

There is an interesting tabular view of the occurrence of fatty deposit in the liver, in different diseases, determined by microscopic examination, in which we find that the hepatic cells were rich in oil in 164 out of 466 bodies, whilst in one of sixteen bodies the fatty deposit pervaded the cells as far as the centre of the lobules. Tubercle of the lungs and the drunkard's dyscrasia are the pathological conditions in which fatty degeneration is most frequent; constitutional syphilis in eight cases was accompanied by a more or less fatty liver. It is very infrequent in caries, but was repeatedly observed in typhus, variola, and pyæmia, as well as in cirrhosis. It is noticeable that the smallest quantity of fat in the liver occurred in diabetes.

There are many interesting questions in connection with fatty liver brought before us in this treatise: What influence is exercised by the organ in the production or modification of fat; what is the pathological importance of fatty liver; what are the effects of the deposited fat upon the function of the liver and upon the entire system; what are the symptoms of fatty liver? None of these questions can be fully answered, but light is thrown upon all of them. A general conclusion is drawn

"That in every instance in which the blood becomes loaded with fat, either as a consequence of improper diet, or owing to abnormal conditions of the metamorphosis of matter, infiltration of the liver with fat may be developed either in transient or permanent form. There are two sets of glands, particularly, which become implicated by this altered condition of the blood, viz., the liver and the sebaceous glands of the skin. A greasy or velvety character of the cutis is thus a frequent accompaniment of fatty liver, and may, under certain circumstances, be of service in diagnosis."

Fatty infiltration is distinguished from fatty degeneration. This last is connected with atrophy, with imperfect nutrition, and here the liver is a sufferer in common with other organs. In the treatment of fatty liver we must regulate the diet, fat and alcoholic drinks to be avoided, and we must exhibit such drugs as may act to increase the secretion and the flow of the bile.

As the affection is found under different circumstances and in connection with several other diseases, no uniform plan can be laid down. We are told that the treatment must be mainly preventive and symptomatic.

The heading of the eighth chapter is "The Pigment Liver; Melanæmic Liver; Alterations in the Liver resulting from intermittent fevers." In the first article devoted to an historical account, we are reminded of the earliest theories of humoral pathology. In the discussions on its nature, origin, and effects, the origin of the pigment was supposed to be elsewhere, but a black viscid blood was said to be furnished to the liver to stagnate there, to become acrid, and, being distributed to other parts of the system, to give rise to most serious derangements, to fevers, convulsions, paralysis, and delirium. Towards the end of the last century Reid attacked these views. Heusinger attributed the morbid condition to a deposit of black pigment, and accounted for it by an exaggerated venous condition of the blood. Still, marsh fevers were regarded as atrabiliary fevers, and, then, when the causes of these fevers were shown to be from a poison in the atmosphere called malaria, the exact origin and composition of which is still unknown, the effects of that poison being principally on the spleen, and the agency of this organ as pigmentary, and in the red blood corpuscles being acknowledged, this whole subject was reviewed, and we are now trying to find out the seat, causes, and effect of what the ancients called atrabile. Black livers are found, and in the same cases black pigmentary deposits have been made in other organs. Bailly, in his account of the pernicious intermittents of Rome, dwells on the dark colour of the cortical substance of the brain. Bright speaks of a brain of the colour of black lead.

Now fever poison acts on the nervous system, presiding over the circulation of the blood, produces hyperæmia of the glands, and in this way at any rate acts on the blood. Enlargement, softening of the spleen, are anatomical characteristics of typhoid as well as of periodical fevers. Hyperæmia of the liver, modifications of its colour and size are especially associated with the last diseases, and are, to a certain extent, diagnostic of them. The mesenteric glands, Peyer's patches, undergo changes in typhoid fever. In disease of the supra-renal capsules, we find pigmentary degenerations,

as well as anæmia, which is so marked an effect of periodical fever. The colouring matter of the blood is modified, but by what organs? We must acknowledge several organs as concerned in blood making. The colouring matter of the urine and of the bile comes from the blood; then the kidneys and the liver have something to do with the colour of the blood. All admit now that disorder of the liver is not the only source of its black colour, but exactly what part the spleen acts in this process we do not know.

The article by Frerichs, containing an anatomical description of the pigment liver and of the co-existing conditions of the spleen, brain, kidneys and heart, is followed by one on the "Plan and Mode of Origin of Pigment," and by another on the "Results produced by the Formation of Pigment upon the Structure and Functions of the various Organs." There are thirteen observations in this chapter. In ten of these cases periodical fever was also present. In the article on etiology we are told that we do not know why this pigmentary degeneration, so associated with intermittent fever, is more frequently met with in certain epidemics. In the treatment, the cure of the periodical fever is spoken of as the first thing. To neutralize, to get rid of the poison is the first object. Our attention is called to its effects on the kidneys—

"Which become diseased in such a manner as to excite apprehension, sometimes at an early date, at other times not until a later period. Albuminuria and hematuria, which accompany the fever paroxysm, and remit and intermit along with it, yield best to quinine, and disappear, for the most part, so soon as the fever ceases."

The great danger in convalescence consisting in derangement of nutrition of the liver from its capillaries being loaded with pigment, and from the antecedent congestion conjoined with the alteration in the composition of the blood, produced by the poison, numerous capillaries being destroyed, and then a gradually increasing atrophy of the gland, which is not to be averted by any treatment known to Dr. Frerichs.

The ninth and last chapter of the first volume is on hyperæmia and its consequences. An account is given of the causes of the circulation in the liver, and of the modifying agencies of adjoining organs, and of the dependence of the circulation on nervous influences. Hemorrhage from the liver, with apoplexy and softening, are treated of in a sort of appendix. This chapter is a short one, and there is not room within our limits for very especial remark. Here, as elsewhere, we recognize how much is being done for, and how much is still wanting in our knowledge of the workings of this organ in health and disease. In tropical countries where its disorders prevail, practitioners and patients seem intimately acquainted with its functions, and the mode and causes of their interruption. The word bilious is in frequent use, and applied under various circumstances, and we are supposed to have several specifics for the relief and cure of those who are said to be in that condition. But when we ask of science a definition of this term, and an explanation of what is included in it, we must read a great deal, and then find out how much yet remains to be discovered. It is comparatively easy to guess at truth, but to get hold of it and put it into scientific formulæ is a most difficult matter.

The second volume of Dr. Frerichs' treatise opens with a chapter on inflammation of the liver. The author tells us that—

"By the term 'inflammation of the liver,' the ancient physicians designated certain groups of functional derangements, with the anatomical origin of which they were but imperfectly acquainted. Hence an indefinite idea was attached

to the term, which comprehended many diseases that did not properly belong to it. Of the earlier observations, those only can with certainty be relied on which proved to be really instances of inflammation, by terminating in the formation of abscess; cases of this nature were long ago described by Hippocrates, and his description was accompanied by some very apposite observations on diagnosis and prognosis. Galen distinguished between phlegmon and erysipelas of the liver, and, in addition to inflammation, described a hot and a cold 'intemperies.' Bianchi designated this intemperies by the term hepatitis, and made phlegmon and erysipelas of the liver distinct from it. In this way many writers fell into the error of making artificial subdivisions, for which no real foundations existed in nature. It was not until the 17th century, when pathological anatomy began to be studied, that a firm foundation was afforded for the clinical observation of these affections; but still, for a long period, physicians applied the term hepatitis to a group of symptoms which, in many instances, did not arise from inflammation of the liver; and, even at the present day, practitioners employ the term inflammation of the liver far more frequently than is warranted by the circumstances of the case."

In this account of a false symptomatology without a proper connection with anatomy and physiology, we recognize the advance made in medical science by the cultivation of pathological anatomy, and by the prevalence of a sounder philosophy, according to which, our powers of observation are employed to ascertain and describe the structure of different parts and organs, to watch them in operation, whilst faculties of arrangement and reasoning are subservient to place the various details in their proper relations. And yet our pathology is still so imperfect that great deficiencies, actual and relative, are at once apparent, when, from our foundation of anatomy and physiology, we try to build up the structure of symptomatology and therapeutics. The ancients failed signally in liver pathology from ignorance of anatomy and physiology; but when we would start with our greatly improved knowledge of structure and function, to give an account of one, and that a most important diseased process, of the inflammation of the organ, we find our progress slow, and we must admit that what we know is far less than what our predecessors of a thousand years ago confidently asserted and maintained. A chapter of one hundred and sixty-six pages is devoted by Mr. Frerichs to inflammation of the liver. His nosology is anatomical. Inflammation of the capsule of the liver, perihepatitis, is discussed in four pages. A comparison is sometimes instituted between our knowledge of the lungs and the liver. What author could undertake to tell all that is known of pleurisy in four octavo pages? We are told that these inflammatory processes are rarely accompanied by serious derangements, and it is only in exceptional cases that they lead to dangerous results. The causes are more frequently disease of the liver itself, or of adjacent parts or organs.

"The chief symptoms by which the disease may be recognized are the following. First, there is tenderness of the hepatic region upon pressure, upon motion, and upon deep inspiration, without any change in the volume or situation of the organ. Jaundice as a rule, is absent, or is slight, and of short duration. In addition, there are the symptoms of the primary disease, simple ulcer or cancer of the stomach, right pleurisy, &c. Febrile excitement of the vascular system is not unfrequently present. When the portal vein, the hepatic veins, or the bile ducts become implicated, the symptoms of disease of the vessels of the liver, or of chronic atrophy, or of obstruction of bile, manifest themselves."

The treatment is given in seven lines, in which bleeding, calomel, neutral salts, rigid diet, and rest are recommended.

Two forms of hepatitis are described, a diffuse inflammation, and a

circumscribed, followed by an abscess. Four cases of the first are given; the anatomical peculiarities are dwelt on at some little length, but no especial article is assigned to the symptoms or treatment, and we are referred to observations made in the first volume. What a difference between what is to be said of acute pneumonia and of acute hepatitis!

Chronic diffuse inflammation of the liver, to which the term cirrhosis is applied, occupies the next seventy-five pages. We have an historical account in which we are told of Morgagni and Baillie, as having recognized this state, at the same time confounding it with other lesions; and of Laennec as the first to apply the term; of the opinions of Bouillaud, and Andral, and Becquerel, whilst an accurate knowledge of the lesion was first obtained through the investigations of Kiernan, Hallmann, and Carswell. Allusion is made to the views of Rokitanski, Gubler, Budd, and Henock; and then there follows quite an elaborate anatomical description. We are reminded how infrequent are the opportunities of tracing the development of induration of the liver during life, or of examining, anatomically, the early stages of the lesion. Hence a difficulty of connecting symptoms with lesions, as well as of treating the successive stages of lesions. We recognize cirrhosis as a sequel of inflammation, hyperæmia, fibrinous exudation, hypertrophy of the connective tissue, as connected with atrophy of the secreting and circulating tissue. Pathologists are not agreed as to what should be called cirrhosis. Inflammation, hypertrophy of connective tissue, atrophy of secreting tissue are the leading features with Frerichs. He has also a separate article for simple induration of the liver, where granulations are not found at the autopsy, but

"Here a dense mass of areolar tissue becomes substituted for the parenchyma of the liver, from which, in many cases, every trace of the glandular tissue has disappeared over large spaces, whilst at other parts brown uniformly distributed dots of the remnants of the secreting cells can still be distinguished."

A diagnosis during life between simple and granular induration is possible only when careful palpation can be practised. The symptoms of the two affections agree. Rokitansky speaks of two forms of cirrhosis, the one proceeding from a morbid development of the capillary bloodvessels, owing to an excessive secretion of bile, the other due to chronic inflammation of the parenchyma. Partial impermeability of the finest ramifications of the portal vein, resulting from inflammation and obliteration, or from lateral compression by the bile ducts, which are enlarged and loaded with fat; such are the anatomical features prominent with Oppolzer. Frerichs admits that the liver becomes granular in hyperæmia, from obstructed circulation in cardiac and pulmonary disease, but he does not agree with Becquerel in calling this cirrhosis, nor does he find disease of the heart and lungs frequent concomitant lesions. It seems to us that no one can say exactly what cirrhosis is anatomically. Inflammation and exudation, modifications of veins, arteries, and ducts are recognized by all authors who are not agreed as to the sequence, or relative prominence of these lesions. The name is anatomical, from appearances rather than from the nature of the lesion. Science has got beyond it, yet we cannot dispense with it. We still want histories of fibrous exudation, of fatty and amyloid degenerations of hypertrophy and atrophy. Attempts at all these are made, but with very partial success. We talk of drunkards' liver, of syphilitic liver. We recognize that also alcohol and syphilis are poisons determined to the liver, influencing its nutrition; but apparently with different effects in

different cases. Frerichs speaks of alcohol as the prominent cause in cirrhosis.

"Of 36 cases of cirrhosis which have come under my observation, twelve of the patients confessed to having been in the habit of drinking brandy in excess, and several of the others were suspected of the same vicious habit." "I have met with cirrhosis and delirium tremens far more frequently at Kiel, where strong spirits are frequently drunk in excess, than at Göttingen and Breslau, where the use of beer or wine is more common." "The rapid absorption of the spirits into the portal vein must give rise to irritation of the liver."

Now, all writers agree in making the liver the prominent organ to suffer in those addicted to the inordinate use of alcoholic drinks. But no explanation can be given. If alcohol does not undergo a change in the system, but is removed from it after it has acted in the venous system and passed through certain emunctories, we cannot suppose that the liver suffers in efforts to expel it. It is taken up by the veins, passed through the liver to the lungs, and thus gets out of the system. The lungs, the excretory organ, do not seem to suffer, but the liver is the seat of the mischief. New wines and beer containing starch and sugar, substances in the assimilation of which the liver has its function, do not as much mischief as malt spirits. This is Budd's observation, and Frerichs confirms it. Then we are told that—

"Whether there are other acrid ingesta, besides alcohol, which by being transmitted in the portal blood through the liver, can irritate this organ in such a manner as to give rise to chronic inflammation with subsequent induration, is a question which has not yet received a satisfactory answer. Budd is inclined to ascribe the frequent occurrence of cirrhosis, in India, to the excessive use of curry and other irritating spices, and there can be no doubt that these and similar substances, such as strong coffee, may excite transient hyperæmias of the liver."

The two prominent blood-making, assimilating, excreting glands—the liver and the lungs—are so related that we cannot take up any point in the pathology of the one without corresponding points in the history of the other occurring to the mind. Cold is said to be the principal cause of inflammation and degeneration of the lungs. Yet this cause is not applied directly to the organ. A healthy man, in active exercise on a cold day, draws cold air into his lungs with impunity. Another, breathing a warmer air, but with cool air applied to the skin, as in a damp, cool atmosphere in which the skin does not readily perform its excreting function, and in which its circulation is not free, has an attack of pneumonia, the exciting cause being a poison in the blood, something that the skin readily excretes, but which is removed by the lungs only with much irritation, with hyperæmia, exudation, and breaking down of tissue. There are atmospherical poisons, telluric poisons acting on the lungs. Bronchial typhus is a disease produced by an animal poison derived from without, an effect of contagion. Now we should expect poisons to be the principal causes of inflammation of the liver. The expression "taking cold," is not as often applied here as it is in affection of the lungs. The effete matter of the body which is still in the blood from defective circulation and excretion of the skin, does not seem to be determined to the liver, the diseases of which organ are most frequent in hot climates. But in these climates there are telluric and atmospherical poisons acting on the nervous system presiding over the circulation and secretion of the liver, and we hear of bilious fevers and of yellow fever. The organ suffers too in some way directly from overwork. Those going from England to India, and continuing the ingestion of alcoholic

drinks, which they had considered wholesome at home, suffer. Is this because the lungs, the excreting organs of alcohol, are less active, and hence alcohol stays longer in its passage through the liver, and has more chance to do mischief? There is less muscular exercise, the circulation is less active in these organs, they do not waste as fast, call less for the material of assimilation, and perhaps in this way the liver may suffer, being supplied with a blood from which the elaborated material has not been removed. The kidneys and the liver seem to be intimately connected. Both suffer from the poison of alcohol. We find bile pigment, leucine, and tyrosine in the urine, when the bile ducts are obstructed. In what way does the liver suffer when the kidneys are deficient? The fact that many causes interfere with the circulation and secretion of both the organs is a reason of our imperfect acquaintance with the symptoms of the diseases of each of them. We speak of syphilis as the cause of disease of the liver. This poison affects also the skin and the mucous membranes; it is in the blood. Like alcohol, it is generally a slow poison, and an opportunity of inspecting the internal organs is only afforded after many years of disease, and it is very seldom that the patient has been all the time under the observation of one practitioner. Our author describes three different forms of syphilitic hepatitis: the first, simple interstitial hepatitis and perihepatitis; the second, hepatitis gummosa; and the third, waxy, amyloid, or lardaceous degeneration.

The second chapter of the volume is devoted to this last affection, which was described by Stahl and Boerhaave, and referred to an accumulation of altered, thickened, or corrupted blood. To Rokitanski is given the credit of being the first to give a clear account of the essential character of this degeneration, and to recognize aright its pathogenetic relations to certain cachexiæ. Our author admits that investigations into the nature of this degeneration are not satisfactory. It is found in the spleen, lymphatic glands, kidneys, bloodvessels, mucous membranes, cartilage, and nerve tissue. It is found in connection with tubercle of the lungs and intestines, with caries and necrosis in scrofulous subjects. Malaria is one of its causes. But, here, in anatomy and etiology, we know more than in symptomatology. Other organs and tissues are so frequently affected, other diseases and disorders are so frequently found in connection with it, that the distinctive marks of the affection of the liver are not well ascertained. The secreting tissue, the apparatus for circulation, is sometimes more and sometimes less injured in the exudations of inflammations, in fatty and amyloid degeneration, and in cancer. When we have detected one of these degenerations as existing in the economy, then we may ask to what extent is the liver its seat. The illustrative cases of these diseases given by our author are well worth perusal, as well as his anatomical descriptions. Foundations are being laid, but the time has not yet come for valuable results in therapeutics. We are learning of the causes of these vicious diseases, and thus know how to advise those predisposed to them. But to detect them and recognize them positively, in their first stages, or to arrest the processes when well advanced, is not yet within our power. In his remarks on abscess of the liver, a limited and comparatively simple affection, our author admits that whilst

"In some cases there are definite symptoms directing attention to the seat of the disease from the beginning; these local symptoms are often so ill defined, or so obscured by others, the manifold varieties which they present are so difficult of analysis, essential symptoms and non-essential, are so easily confounded, that in a very large number of instances, the diagnosis does not rest upon that in-

fallible basis upon which we are enabled to build our conclusions in the case of diseases of other organs."

The third chapter, on hypertrophy, is a very short one. We are referred to the chapter on relative cases and forms, and we are told that—

"The question is still involved in much obscurity, and must be cleared up by subsequent investigation."

The fourth chapter is on pathological new formations, hepatic tumours, some of which are but of slight importance in medical practice, there being scarcely any constitutional symptoms, and their diagnosis being impossible. Hydatids are fully treated with interesting illustrations, and more than eighty pages are devoted to cancer. In one-fourth of the cases analyzed by our author, the disease was primary; and in three-fourths of the cases which were secondary, the site of the primary disease was on some organ of the portal system in two-thirds.

"No particular abnormal conditions are known to predispose to the development of cancer of the liver. The disease is met with in the anæmic as well as in the plethoric; in the badly fed as well as in those who live luxuriously. Neither spirituous liquors nor climate are predisposing causes, nor is it certain that any important influence can be attributed to hereditary transmission. The termination is always fatal; no one has succeeded in proving beyond doubt a single instance of cure. The treatment can only be directed against symptoms."

There is a short article on emphysema hepatis, in the concluding sentence of which we are told—

"Whether emphysema of the liver may, as Louis and Piorry believe that they have proved, exist during life, and be diagnosed from the disappearance of the hepatic dulness, can only be satisfactorily determined by further observations."

The fifth chapter is taken up with diseases of the bloodvessels. Congestion or hyperæmia was regarded as the cause of many symptoms attributed to a failure of the liver in performing its functions, and this congestion was supposed to be from disease of the vessels. But we now recognize the nervous system as paralyzed or unduly stimulated resulting in a failure of the circulation, and a subsequent failure of secretion. Frerichs speaks of the modern tendency to attribute all morbid processes to an anatomical origin being carried too far. He gives a list of twenty-seven authors who have written on obstruction of the portal vein and adhesive pylephlebitis; eight have written on calcification of the portal vein, six on rupture of the portal vein, and twenty-nine on purulent inflammation of the same vessel. He treats in separate articles diseases of the hepatic artery, of the portal vein, and of the hepatic veins. Many diseases or modifications of the arteries are in connection with or subsequent to diseases of the parenchyma, hypertrophy, atrophy, morbid growths. We are told that—

"The symptoms to which aneurism of the hepatic artery gives rise, are accordingly of a three-fold nature. In the first place, there is the tumour, which is sometimes remarkably large, and displaces the liver; secondly, there is the neuralgic pain produced by pressure upon the hepatic plexus of nerves; and, lastly, there is jaundice caused by compression of the bile ducts. The fatal termination, in most cases, takes place under symptoms of internal hemorrhage. It is very easy to mistake such a case for the colic arising from gall stones."

The diseases of the portal vein are enumerated by our author as coagula of blood and inflammation, thrombosis and pylephlebitis; obstruction. We are told that inflammation of the portal vein constitutes the starting-point in a comparatively small number of the cases where it is found. An analysis

of twenty-eight observations of obstruction of the portal vein in reference to the symptoms, has yielded the following results: ascites was absent in only three cases.

"In a man who died of very profuse hemorrhage from the stomach and bowels, I failed to observe either ascites or enlargement of the spleen, notwithstanding the complete occlusion of the trunk and branches of the portal vein. Here the hemorrhage compensated for the serous transudation which would, otherwise, have resulted from the obstruction. Diarrhœa was present in all but three cases, and in one-third of them the evacuations were bloody. In only four cases was there bloody vomiting."

Suppurative inflammation of the portal vein is especially interesting in reference to the metastatic abscesses which were once described as the effects of phlebitis. Our author regards it as almost invariably a consecutive lesion resulting from suppurative processes in the organs, in which the roots of the portal vein originate, or through which the vessel takes its course. Ulcerations of the intestinal canal and stomach constitute the most frequent starting-point of the disease, eight of twenty-five cases originating in this way. Ulceration of the cæcum and appendix vermiformis, in connection with the retention of hard fecal matter or with that of foreign bodies, is frequently a starting-point. Abscesses of the spleen sometimes give rise to suppurative pylephlebitis, and there are several cases on record associated with suppuration in the mesentery and mesenteric glands. Inflammatory irritation of the bile ducts may lead to ulceration and perforation not only of the wall of the bile ducts, but also of the vein.

"The most important data for diagnosis are the following: Pains in the epigastrium above the umbilicus or in the right hypochondrium, or in any of the other localities in which the inflammation has been shown to originate; attacks of rigors, occurring at regular intervals, and followed by profuse sweats; painful enlargement of the liver and spleen, accompanied by jaundice, bilious diarrhœa, and rapid emaciation; and lastly the typhoid symptoms of blood-poisoning, and the symptoms of general peritonitis."

Thus we see that repeated rigors, followed by heat and sweat, as in other cases of pyæmia, are prominent and characteristic symptoms. Of twenty-five cases, the formation of metastatic deposits in other parts of the body took place in only four, the portions of thrombus propelled into the circulation being arrested in the capillaries of the liver. The rapid loss of flesh and strength at an early period are also noticeable, as well as the delirium, somnolence, "the typhoid derangements of the nervous system" coming on later. In thrombus of the portal vein the violent fever with typhoid symptoms is wanting, and in place of peritonitis we find ascites. We are told also that treatment is powerless against suppurative inflammation of the portal vein, and that the disease always terminates in death, recovery being possible only when single branches of the vein are affected.

Adhesive and suppurative inflammation are likewise observed in the hepatic veins, but the diagnosis between obliteration of the hepatic veins and obstruction of the portal vein is impossible. The treatment must be regulated by the same principles as in adhesive pylephlebitis. Suppurative inflammation of the hepatic veins is more common, and is usually the result of hepatic abscesses. The hepatic veins, having no sheath, are more liable to these affections than the portal veins. Purulent phlebitis of the hepatic veins is more frequently accompanied by metastatic deposits in other organs than is the same affection of the portal veins.

Reference is again made to the dilatation of the capillary roots of the

hepatic veins coming on in the course of valvular disease of the heart, and attaining such a degree that the glandular cells in the centre of the lobules disappear, and there is a granular atrophy which our author cautions against confounding with cirrhosis. But we must not linger, and can only notice briefly the sixth and last chapter of the volume, devoted to diseases of the biliary passages.

Inflammation of the biliary passages is described as catarrhal and exudative. Our author tells us that these diseases of the biliary passages have not been sufficiently studied. Bronchitis, or inflammation of the excretory duct of the lung, is a well-known and frequent disease, of which cough and expectoration and rales are symptoms easily appreciated and recognized. The air, varying so much in temperature, and so frequently charged with foreign bodies, containing such different degrees of aqueous vapour, is a ready means of exciting diseased processes. Various poisons contained in the air disturb the circulation and secretion of the lining membrane of these ducts, as influenza and typhus, and their effects are soon detected. Death soon follows upon occlusion or marked obstruction of this duct, and we have opportunities of inspecting the parts after acute diseases and before other organs have undergone morbid alterations, the disorders of which would very much complicate the case. Three causes of catarrhal inflammation of the biliary passages are specified by our author, the most frequent of which is the existence of catarrh of the stomach and duodenum. He tells us that in forty-one cases, premonitory symptoms of gastro-enteric catarrh were discovered in thirty-four, and he seems to think that poisons contained in the atmosphere, as those which give rise to periodical and yellow fevers, act on the liver to disturb its functions by first inducing hyperæmia and inflammation of adjacent organs. Diseases of the parenchyma of the liver, hyperæmia, inflammation, degeneration, give rise to catarrh of the ducts. Now, in all these cases, symptoms from the disease and disorder of the stomach, duodenum, and parenchyma, are the early and prominent ones. The yellow skin and urine tell of the liver being affected, and these may be produced by an obstruction of the ducts from inflammation, thickening, exudation of the lining membrane, or from the secreting cells being acted on, their structure being modified, or the supply of blood or nerve-power failing them. We seem to have no symptoms purely referable to catarrh of the ducts. We explain in this way many cases of jaundice, because we infer that such may be the case, but we can hardly have direct proof that it is so. We do not find evidence of hepatitis, of cirrhosis, of cancer, or other hepatic degenerations, and the temporary and mild symptoms lead us to some state which can supervene and disappear in a short time. It is thus that diagnosis of catarrh of the bile ducts is often arrived at. The third cause of catarrh is the presence of foreign bodies, as concretions, worms, and these affections give rise to symptoms which overshadow those from catarrh. Bilious colic, the passage of a gall-stone, gives rise to catarrh, but it is marked by symptoms which engross the attention, and requires a treatment with but little reference to the catarrh.

The remedies used by our author in the treatment of catarrhal inflammation are rhubarb with carbonate of soda, aloes, colocynth, lemon-juice, bitartrate of potash, nitre, muriatic acid, and the mineral waters of Karlsbad, Marienbad, and Kissingen. Several vegetable extracts, as those of dandelion, celandine, and thistle, are also recommended.

Exudative inflammation of the gall-bladder and ducts, giving rise to pure fibrinous products or to purulent matter abounding in albumen, occurs

in the course of typhus and typhoid fevers, of cholera and pyæmia, as well as in cases of occlusion of the ducts by concretions in them, or by tumours pressing on them. A case from Andral is given where an error in diet was followed by duodenitis, the inflammation extending to the ductus choledochus, which was swollen so as to cause obstruction, its softened coats gave way under the pressure, and death supervened from peritonitis. In a case observed by our author, with the inflammation and ulceration of the mucous membrane of the biliary passages, there was an abscess in the liver of the size of a child's head, perforation of a smaller abscess and peritonitis. Pleurisy, pneumonia, bronchitis, were also present. Great debility, pains of head and abdomen, constipation, moderate cough, mucous expectoration, a moderate febrile movement, were the symptoms when the patient was first observed four weeks after giving up work, a decided rigor ushering in the symptoms; somnolence preceded death, a tinge of yellow was noticed in the skin first at the autopsy. Certainly in this case there were no definite symptoms of exudative inflammation of the biliary passages, and our author tells us we must not expect them until occlusion has taken place so as to interfere with the passage of bile. Our anatomical knowledge goes far before symptomatology here as elsewhere.

An article on constriction and occlusion of the biliary passages is followed by one on their dilatation, which is said to be almost without exception, the consequence of stricture. Dilatation of the gall-bladder is the subject of the next article, and a remarkable case communicated by Dr. Pepper, to this journal, is introduced. In the diagnosis of this affection we are told that

"every semi-globular or pear-shaped tumour that is felt at the margin of the liver must not at once be put down as an enlarged gall-bladder. Echinococci, abscesses of the liver, cancerous tumours of the liver and gall-bladder, may give rise to similar prominences."

Hydatid tumours may present the form of the gall-bladder, and soft medullary cancers sometimes grow from the lower margin of the gland.

In the article on morbid growths of the biliary passages, we are told that cancer may be primary, and that simple cancer of the gall-bladder is most frequent in old persons, commencing in the submucous tissue.

Foreign bodies in the biliary passages are the subject of the sixth article, the first three sections of which are devoted to entozoa, ascarides, hydatids, and distoma. Thirty-seven instances of round worms in the biliary passages are said to be all that are recorded in medical literature. In several of these cases death was attributable to their presence; colic and convulsions being prominent symptoms. Jaundice and white stools characterized other cases, whilst, sometimes, there were no symptoms referable to the liver.

The distomata are said to have their habitat in the biliary passages of the ruminantia, and are rarely found in the human body.

In the cases of the human subject the diagnosis of distomata could only be arrived at when they were ejected by vomiting or with the stools. Their etiology is still obscure. They probably enter the intestinal canal as cercariæ. In sheep jaundice rarely shows itself, and then only lasts a short time; a condition of anæmia being ultimately developed.

The subject of gall-stones occupies the last section in this article, and seventy octavo pages are devoted to it. First, we have an historical account, and, then the chemical and physical characters are given at some length. Mode of origin, disintegration, and etiology are successively brought forward. We are told that "cholesterine" is very rarely absent, and usually

forms the principal constituent of biliary concretions, colouring matter being found in all of them, but with few exceptions, there being several forms partly free and partly united with calcareous matter. Small quantities of biliary acids, in combination with a base, are found in most gall-stones, fatty acids and soaps, mucus and epithelium, oxides of iron, manganese, and copper, carbonates of lime and magnesia, earthy carbonates, phosphates and sulphates being other ingredients. The three parts of compound calculi, the nucleus, the shell, and the crust, are separately described; and then follows the article on their mode of origin. Stagnation and decomposition of bile constitute the primary cause of the formation, all the various ingredients of these concretions, except epithelium and mucus, being contained in a state of solution in normal bile. Still, our knowledge of the formation of these bodies is admitted to be very defective in many particulars.

"The diagnosis of gall-stones is easy or difficult, according to the severity of the derangements that they excite in the liver and its excretory apparatus."

We sometimes find gall-stones in the evacuations, when their existence has not been suspected, whilst the clinical features of hepatic colic cannot be confounded with those of any other affection.

But the practical question of treatment—how is that answered? Here too our knowledge is imperfect. We give one more extract, that our readers may have the views of our author on an important point, in his own words.

"The conditions under which a solution of a concretion is brought about, vary according to the nature of the external crust. Cholesterine and the compound of cholepyrrhin and lime, which are its most important constituents, and likewise, the mucus and cholate of lime may be dissolved by very alkaline bile; but this will produce no change upon a crust composed of carbonate of lime. Moreover, bile of a thin watery character may loosen the stones, dissolve their connective material, and so lead to their mechanical destruction or comminution. Hence the reason is intelligible why Hoffman's idea of employing alkalies in the treatment of gall-stones has again come to prevail, more particularly in the form of the alkaline mineral waters, which, as is shown by experience, produce a copious secretion of bile.

"These mineral waters" [of Karlsbad, Vichy, Ems, Marienbad, Eger] "have certainly proved the most efficacious remedies against gall-stones. In many cases I have directed my patients to go to Karlsbad, and have known them to return cured. In other cases I have known favourable results ensue under my own eyes, from drinking the water brought from the mill spring of Karlsbad, either cold or warm. French physicians speak in similar terms of Vichy water."

"The result, however, must not be mainly referred to the solvent power of these springs. The concretions are not dissolved to any great extent; most of them are voided unchanged under all the symptoms of hepatic colic; they are propelled by the current of the bile, the quantity of which is increased. It is a question for the medical men at Karlsbad and Vichy to determine more accurately than has hitherto been done, in what form gall-stones are voided under the use of those springs, whether unchanged, or eroded, or comminuted.

"If we have to choose from among the mineral waters above mentioned, Karlsbad and Vichy stand pre-eminent as the most efficacious; the former is to be preferred where there is not obstinate constipation. Ems is to be recommended to very irritable debilitated patients, suffering from a tendency to diarrhœa; Marienbad to plethoric patients with a disposition to congestions. The bicarbonate of soda, by itself, in combination with the sulphate of soda, is less efficacious than the mineral waters, being more apt to derange digestion, and ought to be given very diluted."

Bidder and Schmidt say that an increased ingestion of water is followed by an augmented secretion of thin bile, and Vanotti believes that he cured a case of gall-stones by the simple drinking of large quantities of water.

Hepatic neuralgia, independently of gall-stones, is believed in by our author, and an illustrative case given. In the appendix we have a description of gall-stones in twelve cases, and in a second article experiments on the excretion of hippuric acid by Dr. Neukomm.

We have thus endeavoured to give some account of the treatise by Dr. Frerichs. The importance of the subject and the fact of the work not having been republished in this country, are reasons for the extended notice. There are so many matters of interest in both volumes, so much that is still imperfectly explained and understood, that it has not been easy to confine ourselves to the present limits. There are ample opportunities in our country for studying these diseases, and they have not been neglected. We must go on in our efforts to ascertain more definitely how the liver performs its several functions. We hope that Dr. Flint will go on with his experiments and observations on its excreting office. Its functions in nutrition, in blood making, in the formation of sugar and fat, need to be more accurately defined and described, and we must still ask how does it contribute to sustain animal heat. It is certainly remarkable that an agent which has had a reputation for so long a time for powers of modifying and increasing the secretion of the organ, should now be on trial, and the question asked, after all has it any efficacy? Dr. Inman, of Liverpool, is maintaining that there is evidence that mercury does not increase the hepatic secretion, and Dr. Thudicum tells us of Dr. Mosler's proving that mercury does not make its appearance in the bile when given in the form of calomel, and of conclusions from several experiments, that the chances are six to one that calomel will diminish the quantity of bile secreted. "So move we on." Two hundred years ago the pathology of the liver was given with great assurance and certainty; its therapeutics were not doubted; but, now, a clinical treatise in two volumes, published successively in the course of two years, can only be regarded as a contribution, and views taken in it must be modified to meet researches which have been made and published since the work was undertaken. High praise should be awarded to it, and we shall look forward with interest to the subsequent researches of the author, as well as to those of others who without the means of, and incentives to exploration and study possessed by him, are living in countries and climates where the diseases and disorders of the organ are much more rife, and who thus have still greater opportunities of clinical observation.

Dr. Frerichs has given us a good clinical treatise on diseases of the liver. It must be carefully read by all who would have a distinct idea of what is and what is not known of the matters there treated, by all who would study the subject for themselves. Many of the questions arising in the mind of the practising physician are not satisfactorily answered even there; but ways are pointed out in which knowledge has been obtained, and in which more is to be had. We recognize how various are the functions of the organ, and we acknowledge how difficult it is of exploration, and how much less easily the fluid manufactured by it can be got hold of for analysis than that coming from the kidneys. Still, so much has been done in spite of all obstacles—so much skill, perseverance, and love of truth have been shown by various experimenters and observers, that we must be hopeful for the future, and believe that our present works on diseases of the liver will ere long be superseded, although they will not lose their place in the annals of science, and will be remembered as identified with stages in a continual progress towards a goal which is still far off, and may never be reached. G. C. S.

ART. XV.—*Origin, Antiquity, and Zoological Relations of Man.*

1. *The Geological Evidences of the Antiquity of Man, with remarks on Theories of the Origin of Species by Variation.* By Sir CHARLES LYELL, F. R. S., etc. etc. Illustrated by wood-cuts. George W. Childs: Philadelphia, 1863. 8vo. pp. 518.
2. *Pre-historic Man. Researches into the Origin of Civilization in the Old and the New World.* By DANIEL WILSON, LL. D., Professor of History and English Literature in University College, Toronto, etc. Macmillan & Co.: London, 1862. 2 vols. 8vo. pp. 488 and 499.
3. *Evidence as to Man's Place in Nature.* By THOMAS HENRY HUXLEY. London and Edinburgh, 1863. 8vo. pp. 159.
4. *Ethnology and Phrenology, as an aid to the Historian.* By J. W. JACKSON. Trübner & Co.: London, 1863. 8vo. pp. 324.
5. *The Races of the Old World: a Manual of Ethnology.* By CHARLES L. BRACE. Charles Scribner: New York, 1863. 8vo. pp. 540.
6. *Pre-Adamite Man: The Story of the Human Race, from* 35,000 *to* 100,000 *years ago.* By GRIFFIN LEE, of Texas. Sinclair Tousey: New York, 1863. 8vo. pp. 408.
7. *A History of the Intellectual Development of Europe.* By JOHN WILLIAM DRAPER, M. D., LL. D., Professor of Chemistry and Physiology in the University of New York, etc. etc. Harper & Brother: New York, 1863. 8vo. pp. 631.
8. *Antiquités Celtiques et Antédiluviennes. Mémoire sur l'Industrie primitive et les Arts à leur Origine.* Par M. BOUCHER DE PERTHES. Treuttel et Wurtz: Paris, Tome 1, 8vo. pp. 628. Avec 80 planches représentant 1600 figures; Tome 2, 8vo. pp. 511. Avec 26 planches représentant 500 figures.
9. *Anthropologie der Naturvölker.* Von Dr. THEODOR WAITZ, Professor der Philosophie zu Marburg. Erster Theil: Ueber die Einheit des Menschengeschlechtes und den Naturzustand des Menschen. 8vo. pp. 487. Zweiter Theil: Die Negervölker und ihre Verwandten. Mit einer Karte und sieben Abbildungen. 8vo. pp. 524. Friedrich Fleischer: Leipzig, 1859, 1860.
10. *The Anthropological Review and Journal of the Anthropological Society of London*; No. 1. London, 1863. 8vo. pp. 192.
11. *Bulletins de la Société d'Anthropologie de Paris*, t. 1 et 2. Victor Masson et Fils: Paris, 1860, 1861. 8vo. pp. 576 and 710.
12. *Mémoirs de la Société d'Anthropologie de Paris.* T. 1. Fascic. 1, 2 et 3. Paris, 1861.

PROFESSOR AGASSIZ has somewhere said "that whenever a new and startling fact is brought to light in science, people first say, 'it is not true,' then that 'it is contrary to religion,' and lastly, 'that every body knew it before.'" A somewhat similar idea finds expression in the characteristic language with which Dr. Knox, that bold adventurer in ethnology, prefaces his remarkable work on the *Races of Men*. "As to the hack compilers," he says, "their course is simple; they will first deny the doctrine to be true; when this becomes clearly untenable, they will deny that it is new; and they will finish by engrossing the whole in their next compilations, omitting carefully the name of the author."

These statements are the embodiment of the melancholy fact—unhappily too well known to the pioneers of knowledge—that every science secures for itself recognition and a place in the circle of the sciences, only after the most severe and prolonged struggle with ignorance, incredulity, and dogmatic prejudice. It was thus with chemistry, astronomy, palæontology, geology, etc.; and it is now so eminently true of ethnology as to have won for this, the youngest of the sciences, the expressive title—"la science militante."

The history of ethnology, as thus far developed, is the record of three great controversies concerning—1st. The unity or plurality of origin of man. 2d. The date of his advent upon earth; and, 3d. His exact position in the zoological scale. In some form or another, now in this place and then in that, the discussion of these profoundly complicated problems has been carried on with varying and indefinite results for many years past. Formerly the theologian occupied the field of dispute to the exclusion of all others. Now, however, the zoologist, the geologist, the philologist, and the antiquarian have entered the arena, in full armor, each willing to do battle for the truth against all comers; while the world of science and of letters looks on, with constantly deepening interest, and brimful of expectation as to the important truths which will sooner or later be elicited by the conflict. Under the stalwart blows of the combatants ethnology is gradually taking a definite shape. New accessions are daily made to its storehouse of facts, and these, duly arranged and classified, are having their true value assigned to them.

With the object of acquainting our readers with the present status of ethnology we purpose, in the following pages, to give a brief account of recent inquiries as to the origin and antiquity of man, and the place which he occupies in nature.

I. More than two hundred years have elapsed since the much vexed question of the original unity or diversity of man was first agitated. It is a curious fact that the earliest and for a long time the only attempt to bring the unity doctrine into disrepute, was made not by the naturalist, but by a bold and restless theologian—one Peyrerius[1]—whose daring, scholastic essay upon the Pre-Adamites,[2] published in 1655, aroused the indignation of both Protestant and Catholic clergy, and was, by command of the Sorbonne, publicly burned in the Place de Grève by the common hangman. From that day to the present, this acrimonious discussion, originating thus in the domain of the theologian, and at first debated entirely upon theological grounds, as may be seen by referring to some of the replies to Peyrerius' work,[3] has gradually grown stronger and stronger until its vehemence has caused the whole science of ethnology to assume a somewhat offensive and suspicious attitude in the eyes of many people. The fact that Voltaire, D'Hancarville and other deistical writers took an early part in the controversy, was not without its prejudicial effect upon the popular mind. Vol-

[1] Isaac Peregre was a Calvinist scholar of Bordeaux. The Inquisition compelled him to abjure both his Calvinism and his Pre-Adamite heresy. He died in a convent in 1676.

[2] Præ-Adamitæ, sive exercitatio super versibus XIImo., XIIImo., et XIVto capitis quinti Epistolæ D. Pauli ad Romanos. Quibus inducuntur primi homines ante Adamum conditi. Anno Salutis MDCLV.

[3] See among others that curious work entitled, Non-ens Præ-Adamiticum. Sive confutatio vani et Socinizantis cujusdam Somini, etc. Autore Antonio Halsio, Lugd. Batav. MDCLVI.

taire ridiculed the unity doctrine unmercifully; D'Hancarville, on the contrary, though equally heterodox as Voltaire, supported this dogma in positive terms.

At length Linnæus, in the 12th edition of his famous *Systema Naturæ*,[1] by recognizing two species of the genus Homo—H. sapiens and H. troglodytes—espoused, in a measure, the plurality doctrine, and made the first decided attempt to shift the whole controversy from grounds purely theological to others more scientific and more within the compass of the methods of research familiar to zoologists. Linnæus was followed in this direction by Virey, Desmoulins, Bory de St. Vincent, Jacquinot, Hombron, Dumontier, Blanchard, Berard, Morton, Agassiz, Knox, Caldwell, Hamilton Smith, Burke, Van Amringe, Maury, Lucas, Broc, Giebel, Klemm, Zeune, Remusat, Pouchét, and many others. All these writers, basing their arguments upon scientific facts, have more or less positively proclaimed their belief in the plural origin of man. The unity doctrine, on the other hand, has been maintained, also upon zoological grounds chiefly, by Buffon, Zimmerman, Camper, Blumenbach, Georges Cuvier, John Hunter, Lesson, Lacepède, Griffith, Foster, Walckenaer, Haller, Weber, Tiedemann, Prichard, Pitta, Wagner, Bakker, Herder, Flourens, J. Müller, Serres, De Quatrefages, Humboldt, Carpenter, Hall, Owen, Draper, Godron, and others. The theological or Scriptural aspects of the question have been debated, with more or less acerbity, by Fabre d'Olivet, Rafinesque, Klee, Cardinal Wiseman, the Abbes Frère, Migne, Forichon and Maupied, and other transatlantic writers; and in this country, among others, by Nott, Gliddon, Bachman, Hamilton, Smyth, Cabell, Baldwin, Hodge, and Pendleton. The half-theological, half-scientific discussion in which these writers have taken part, may be regarded as having been inaugurated in 1774, when Lord Kaims published his well-known *Sketches of the History of Man*, in which he had the hardihood to advocate the doctrine of the original diversity of mankind. The heterodox conclusions of this writer, being regarded as an attack upon the verity of revealed religion, were criticized by the Rev. S. Stanhope Smith, in an appendix to a paper read before the American Philosophical Society, and first published in 1787.[2] This essay was in turn commented upon by Charles White, in a series of Discourses delivered before the Literary and Philosophical Society of Manchester.[3] Smith subsequently animadverted upon the remarks of White, and the controversy gradually spread to other writers of less note. At a later period (1847) Dr. Morton published an *Essay on Hybridity*. This was opposingly reviewed by the Rev. Dr. Bachman in the *Charleston Journal*. Morton replied, and very soon some of the points so hotly contested in the old Peyrerian debate were once more revived and discussed. In December, 1848, Dr. J. C. Nott, of Mobile, delivered from the chair of Political Economy of the University of Louisiana, *Two Lectures on the Biblical and Physical History of Man*. About the same time (July, 1850), Agassiz announced in the *Christian Examiner*, of Boston, his conviction that man was plural in origin. These publications called forth a reply from the Rev. Dr. Hamilton, in a work entitled *The Friend of Moses*. At this

[1] See also his Mantissa Plantarum Altera. Holmiæ, 1771.

[2] An Essay on the Causes of the Variety of Complexion and Figure in the Human Species, &c. By Samuel Stanhope Smith, D. D., LL. D., &c. 2d edition. New Brunswick, 1810.

[3] An Account of the Regular Gradation in Man, and in different Animals and Vegetables, &c. By Charles White. London, 1799.

time, also (1849—1851), the Rev. Dr. Thos. Smyth, by lectures and a series of papers contributed to different religious serials, and afterwards collected and published in one volume, endeavoured to prove that the unity of the human races was the doctrine of Scripture, reason, and science. The discussion became very animated, and gradually assumed not a little of the bitterness so characteristic of religious controversy. In 1854 appeared the *Types of Mankind*, a work in which, unhappily for ethnology, religion was again mixed up with science, and a determined and aggressive attack made upon the Mosaic account of the origin and early history of man, or rather, to speak more correctly, upon the generally received interpretation of that account. A series of articles, directed chiefly against Messrs. Agassiz, Nott, Gliddon, and Patterson, quickly appeared in the *Charleston Journal* from the pen of Dr. Bachman. Nott defended himself, and Luke Burke, of London, in his turn, attacked Bachman in a caustic review contributed to the pages of the *Charleston Journal*. At a later period, upon the publication of *Indigenous Races of the Earth*, the controversy was transferred to the pages of the *New Jersey Medical and Surgical Reporter*, and there carried on by other writers whose vehemence and misguided enthusiasm were, in most instances, equalled only by their profound ignorance not only of the facts but also of the practical objects and philosophical methods of ethnology.[1]

Within the last two years the ethnological controversy has again been transferred to Europe, in consequence of the publication, in 1858, of M. Pouchet's able work, entitled *De la Pluralité des Races Humaines*. An unfavourable report upon this work was presented to the Academy of Sciences, Belles-Lettres and Arts of Rouen, by M. de Saint-Philbert, who commented severely upon the opinions advanced by M. Pouchet, and pronounced them to be materialistic in their tendency and subversive of all religious faith. To this report M. Pouchet replied in a sharply-written letter, dated May 20, 1859, and entitled *Science et Religion*, and here the controversy, in this direction, rests for the present.

II. Closely connected with the vexed question of mankind's origin, so long and so violently debated, is that of the antiquity of man, a subject which is attracting, at the present time, an unusual degree of attention, owing more especially to the discovery of flint implements and other traces of human art in the diluvial formation both of France and England.

This discovery was first made at Abbeville, in France, by M. Boucher de Perthes,[2] who, after communicating the results of his labours, commenced as long ago as 1826,[3] to the Imperial Society of Emulation at Abbeville, published an elaborate work on the subject, entitled *Antiquités Celtiques*

[1] In proof of this, see, among other articles, an extraordinary "Critique on Nott and Gliddon's Ethnological Works." By Abraham Coles, M. D. Reprinted from the Reporter for September, 1857.

[2] We are aware that 70 years ago, John Frere, F. S. A., discovered in the parish of Hoxne, in the county of Suffolk, England, some flints which he exhibited to the Antiquarian Society, observing that he thought they belonged to a very remote period, even beyond that of the present world, and that the spot in which they were found was probably the place of their manufacture, and not of their accidental deposit. No notice, however, appears to have been taken of his discovery.

[3] As far back as 1805, M. de Perthes visited the Roland grotto, near Marseilles, and in 1810 the Grotto de Palo in the Papal dominions, and detected among some animal bones certain flints, with the yellow tint of which he was struck as being analogous to that exhibited by certain beds of the diluvians. He was led by this circumstance to seek these stones in their natural position. A favourable oppor-

et Antédiluviennes, the first volume of which appeared in 1849, and the second in 1857. In that work the author contended that his discoveries positively proved the extreme antiquity of man, and his opinions, though for a long time treated with indifference and incredulity, at length found some support in the researches of M. Aymard, a distinguished palæontologist and antiquary, who discovered, some years ago, in the volcanic district of Central France, the skulls, teeth, and some of the bones of two human skeletons imbedded in a volcanic breccia found in the mountain of Denise, in the environs of Le Puy-en-Velay, a breccia anterior in date to one, at least, of the latest eruptions of the volcanic mountain.[1] Subsequently the stratified gravel in the neighbourhood of Abbeville and Amiens, and the quarries of St. Acheul and St. Roch, were explored by Mr. Joseph Prestwich, Sir Charles Lyell, Dr. Rigollot,[2] and Messrs. Buteux, Pictet, Scrope, Hébert, Lartet, Austen, Flower, Mylne, Falconer, Evans, and Pouchet.[3] Mr. Prestwich also explored the diluvium at Hoxne in Suffolk, England, established its perfect analogy with that at Abbeville, and found therein similar fossil bones and flint axes.[4] All these gentlemen, with the exception of Mr. Scrope, incline more or less strongly to the belief that these flints and the fossil remains found with them indicate a higher antiquity for man than is usually acknowledged. Sir Charles Lyell, indeed, in his Address before the meeting of the British Association held at Aberdeen, in 1859, went so far as to say, and this assertion he reiterates in the work under notice, that "scepticism in regard to the cave-evidence in favour of the antiquity of man has hitherto been pushed to the extreme," that man was probably old enough to have coexisted with the Siberian mammoth, that the antiquity of the Abbeville and Amiens flint instruments is great indeed if compared to the times of history and tradition, and that a vast lapse of ages appears to have separated the era in which the fossil implements were formed, and that of the invasion of Gaul by the Romans.

At the same meeting the Rev. Dr. Anderson opposed the ascription of a high antiquity to man, and in this country the Rev. Dr. Pendleton, of Lexington, Virginia, has quite lately taken up the subject in a spirit more of criticism than of original research. This gentleman assails Lyell actively, and insinuates that the accustomed scientific caution of the eminent geologist has forsaken him, that he is inconsistent and self-contradictory, and that the change in his former belief concerning the age of mankind is due, not to the discovery of the flint axes of Abbeville and Amiens alone, but also, in part, to the disposition which he manifests to receive and indorse

tunity at length presented itself in consequence of the successive exposure of numerous beds of the diluvium upon which the valley of the Somme reposes, caused by the extensive works undertaken for the fortification of Abbeville, the digging of a canal, and the preparations for the railroads between 1830 and 1840.

[1] "On the opposite side of the mountain beds of tufa, apparently contemporaneous with those in which human bones have been found, are certain remains of the diluvian fauna, specially of the mammoth. These facts seem to indicate that man lived in Auvergne at a remote period, when the volcanoes were in a state of activity, and the extinct diluvian fauna still existed." (Pictet, *Biblioth. Univ. de Genève*, 1860.)

[2] Mémoire sur les Instruments en Silex trouvés à St. Acheul, près d'Amiens, et considérés sous les rapports géologique et Archeologique, Amiens, 1854.

[3] Excursion aux Carrières de St. Acheul. Extrait des Actes du Muséum d'Histoire Naturelle de Rouen, 1860. See also for much interesting information the voluminous "Notes et Correspondance" at the end of the 2d volume of Boucher de Perthes' work.

[4] See an extract from the Proceedings of the Imperial Society of Emulation at Abbeville. Séance of June 23, 1859, published in L'Abbevillois for July 7, 1859.

the recent work of Darwin on the *Origin of Species*, a work which Dr. Pendleton regards as "skilful and able," it is true, but also as "discredited alike by the requirements of inductive philosophy, by the established laws of evidence, by the moral instincts, the individual aspirations and the social interests of mankind, and by all the sacred realities of religion," and the final conclusions of which he thinks exhibit the "blackness of atheism," unrelieved by a single ray of light.[1] And yet the fundamental principle of continuous descent with modification through natural selection, so ably advocated in this "wonderful work," as it has justly been called,[2] is, in many respects, calculated, better than any other theory perhaps, to remove certain weighty objections which still oppose the scientific acceptance of the doctrine of man's original unity, for the facts and arguments brought forward by Darwin go very far, as he interprets them, towards reconciling the morphological doctrine of unity of type amidst endless diversity of form, with the teleological notion of the conditions of existence.

The results of the systematic investigation which was made in 1858 of the Brixham cave, near Torquay, in Devonshire, led to a re-examination in England and on the Continent of the numerous facts previously brought forward in support of the opinion, that man coexisted in ancient times with certain species of mammalia long since extinct. As new cases bearing on the same question, whether relating to caves or to alluvial strata in valleys, were constantly occurring, Sir Charles Lyell, in order to qualify himself for their appreciation and discussion, visited, in the course of the last three years, many parts of England, France, and Belgium, and communicated, personally or by letter, with many of the English and foreign geologists who have taken part in these researches.

The results of these deeply interesting inquiries are embodied in the work under notice, for an exact and elegant reprint of which, beautifully illustrated, we are indebted to the intelligent enterprise and liberality of Mr. Childs. A description is also given of the glacial formations of Europe and North America, with the object of considering the probable relations of these in a chronological point of view to the human epoch, and why, throughout a great part of the northern hemisphere, they so often interpose an abrupt barrier to all attempts to trace further back into the past the signs of the existence of man upon the earth. In the concluding chapters of his work, the distinguished author discusses briefly the recent modifications of the Lamarckian theory of progressive development and transmutation, which are suggested by the recent work of Darwin on the *Origin of Species, by Variation and Natural Selection*, and the bearing of this hypothesis on the different races of mankind, and their connection with other parts of the animal kingdom.

It will thus be seen that the work divides itself into three parts; the first of which contains an excellent resumé of all thus far known of the pre-historic traces of man; the second gives us an account of the glacial period; while the third is devoted to an elaborate discussion of the claims of the Darwinian theory. To use the words of the *Saturday Review*, the "work is a trilogy, the constituent elements of which should be headed, respectively, Pre-historic Man, Ice, and Darwin."[3]

With a view to the better understanding of the geological aspect of the

[1] Science a Witness for the Bible. By Rev. W. N. Pendleton, D. D., Philadelphia, 1860. Discussion IV., on the Age of Mankind.

[2] See British and Foreign Medico-Chirurgical Review for April, 1860. Review V.

[3] See Natural History Review, April, 1863, p. 212.

question of human antiquity, an abridged general table of fossiliferous strata is given in the first chapter, together with some remarks upon the relations of these strata and their nomenclature.

In the second chapter a concise account is given of the various evidences of man's existence during the formation of the "recent" or upper post-pliocene deposits of the post-tertiary strata. These evidences consist of works of art found in the Danish peat, in the Danish shell-mounds, or kjökkenmödding, in certain ancient Swiss lake-dwellings, built on piles, and in similar Irish lake-dwellings, or crannoges. The rude industrial implements collected in these different localities have been carefully studied by MM. Nillson, Steenstrup, Forchhammer, Thomsen, Worsäae, and other celebrated Danish and Swedish antiquaries and naturalists, who have by this means established for Scandinavian man a chronological succession of periods designated as the ages of stone, of bronze, and of iron, according to the material of which the instruments were constructed.

The Danish peat-deposits vary in thickness from ten to thirty feet, the lower stratum consisting chiefly of moss or sphagnum supporting another growth of peat not composed exclusively of aquatic or swamp plants. Throughout these deposits the prostrate trunks of trees are imbedded at various depths. In the lowest part are found the trunks of the Scotch fir, a tree evidently indigenous in the human period, but no longer extant in the Danish islands. At higher levels are found numerous trunks of the common oak, which appears to have supplanted the fir. Still higher occurs the pedunculated variety of the same oak, along with the alder, birch, and hazel. The common beech now takes the place of the oak in Denmark. The white birch appears in the lower part of the bogs, and disappears from the upper, while the aspen occurs at all levels, and still flourishes in Denmark. The land and fresh-water shells and the mammalian remains, like those of the plants hitherto discovered in these peat beds, are of recent species.

"The age of stone in Denmark coincided with the period of the first vegetation, or that of the Scotch fir, and in part at least with the second vegetation, or that of the oak. But a considerable portion of the oak epoch coincided with 'the age of bronze,' for swords and shields of that metal, now in the Museum of Copenhagen, have been taken out of peat in which oaks abound. The age of iron corresponded more nearly with that of the beech-tree.[1]

"It has been suggested that an age of copper must always have intervened between that of stone and bronze; but, if so, the interval seems to have been short in Europe, owing apparently to the territory occupied by the aboriginal inhabitants having been invaded and conquered by a people coming from the East, to whom the use of swords, spears, and other weapons of bronze was familiar. Hatchets, however, of copper have been found in the Danish peat."

The Kjökkenmödding, or "kitchen-refuse-heaps," are mounds found along the shores of all the Danish islands, and composed of shells of oysters, cockles, and other mollusks, intermingled with the bones of various quadrupeds, birds, and fish which once served as the food of the rude hunters and fishers by whom the mounds were accumulated. These mounds are from 3 to 10 feet high, from 150 to 200 feet wide, and in some places 1000 feet long.

"Scattered all through these heaps are flint knives, hatchets, and other instruments of stone, horn, wood, and bone, with fragments of coarse pottery,

[1] Morlot, Bulletin de la Société Vaudoise des Sci. Nat., t. vi. p. 292. The reader will find a translation of M. Morlot's instructive paper in the Smithsonian Report for 1860.

mixed with charcoal and cinders, but never any implements of bronze, still less of iron. The stone hatchets and knives had been sharpened by rubbing, and, in this respect, are one degree less rude than those of an older date, associated in France with the bones of extinct mammalia. These shell-mounds correspond in date to the older portion of the peaty record, or to the earliest part of the age of stone as known in Denmark."

During the past ten years the lakes of Switzerland and Great Britain have also furnished to the zealous antiquarian and naturalist information relative to the chronology of the human family. At the bottom of many Swiss lakes, in places where the water is from five to fifteen feet deep, ancient wooden piles have been discovered, in some instances projecting above the surface of the mud, and in others worn down to the level of it. There is ample evidence that these piles once supported villages long since crumbled into decay, and some of which were undoubtedly built during the age of stone, as may be inferred from the fact that numerous implements resembling those of the Danish shell-mounds and peat-mosses have been rescued from the mud surrounding the piles.[1]

With regard to the antiquity of the evidences of man's existence found in these different localities, Sir Charles Lyell thus writes:—

"What may be the antiquity of the earliest human remains preserved in the Danish peat cannot be estimated in centuries with any approach to accuracy. In the first place, in going back to the bronze age, we already find ourselves beyond the reach of history or even of tradition. In the time of the Romans the Danish Isles were covered, as now, with magnificent beech forests. Nowhere in the world does this tree flourish more luxuriantly than in Denmark, and eighteen centuries seem to have done little or nothing towards modifying the character of the forest vegetation. Yet in the antecedent bronze period there were no beech trees, or at most but a few stragglers, the country being then covered with oak. In the age of stone, again, the Scotch fir prevailed, and already there were human inhabitants in those old pine forests. How many generations of each species of tree flourished in succession before the pine was supplanted by the oak, and the oak by the beech, can be but vaguely conjectured, but the minimum of time required for the formation of so much peat must, according to the estimate of Steenstrup and other good authorities, have amounted to at least 4,000 years; and there is nothing in the observed rate of the growth of peat opposed to the conclusion that the number of centuries may not have been four times as great, even though the signs of man's existence have not yet been traced down to the lowest or amorphous stratum."

"The attempts of the Swiss geologists and archæologists to estimate definitely in years the antiquity of the bronze and stone periods, although as yet confessedly imperfect, deserve notice, and appear to me to be full of promise. The most elaborate calculation is that made by M. Morlot, respecting the delta of the Tinière, a torrent which flows into the Lake of Geneva near Villeneuve. This small delta, to which the stream is annually making additions, is composed of gravel and sand. Its shape is that of a flattened cone, and its internal structure has of late been laid open to view in a railway-cutting one thousand feet long and thirty-two feet deep. The regularity of its structure throughout implies that it has been formed very gradually, and by the uniform action of the same causes. Three layers of vegetable soil, each of which must at one time have formed the surface of the cone, have been cut through at different depths. The first of these was traced over a surface of 15,000 square feet, having an average thickness of five inches, and being about four feet below the present surface of the cone. This upper layer belonged to the Roman period, and contained Roman tiles and a coin. The second layer, followed over a surface of

[1] For a full and deeply interesting account of these lacustrine villages, the reader is referred to the beautiful work of Frédéric Troyon, entitled "Habitations Lacustres des temps anciens et modernes, Lausanne, 1860." Portions of this work have been translated and published in the Smithsonian Report for 1861.

25,000 square feet, was six inches thick, and lay at a depth of ten feet. In it were found fragments of unvarnished pottery and a pair of tweezers in bronze, indicating the bronze epoch. The third layer, followed for 35,000 square feet, was six or seven inches thick, and nineteen feet deep. In it were fragments of rude pottery, pieces of charcoal, broken bones, and a human skeleton having a small, round, and very thick skull. M. Morlot, assuming the Roman period to represent an antiquity of from sixteen to eighteen centuries, assigns to the bronze age a date of between 3,000 and 4,000 years, and to the oldest layer, that of the stone period, an age of from 5,000 to 7,000 years.

"Another calculation has been made by M. Troyon to obtain the approximate date of the remains of an ancient settlement built on piles and preserved in a peat-bog at Chamblon, near Yverdun, on the Lake of Neufchatel. The site of the ancient Roman town of Eburodunum (Yverdon), once on the borders of the lake, and between which and the shore there now intervenes a zone of newly-gained dry land, 2,500 feet in breadth, shows the rate at which the bed of the lake has been filled up with river sediment in fifteen centuries. Assuming the lake to have retreated at the same rate before the Roman period, the pile-works of Chamblon, which are of the bronze period, must be at the least 3,300 years old.

"For the third calculation, communicated to me by M. Morlot, we are indebted to M. Victor Gilliéron, of Neuveville, on the Lake of Bienne. It relates to the age of a pile-dwelling, the mammalian bones of which are considered by M. Rütimeyer to indicate the earliest portion of the stone period of Switzerland, and to correspond in age with the settlement of Moosseedorf.

"The piles in question occur at the Pont de Thièle, between the lakes of Bienne and Neufchatel. The old convent of St. Jean, founded 750 years ago, and built originally on the margin of the Lake of Bienne, is now at a considerable distance from the shore, and affords a measure of the rate of the gain of land in seven centuries and a half. Assuming that a similar rate of the conversion of water into marshy land prevailed antecedently, we should require an addition of sixty centuries for the growth of the morass intervening between the convent and the aquatic dwelling of Pont de Thièle, in all 6,750 years."

These estimates, it will be observed, express not the probable age of man so much, as the *lowest* antiquity of certain events and movements indicative of his presence on earth. They are but rough approximations to the truth, and must be received cautiously. But what, we may ask, is the *greatest* antiquity which geological research has yet been able to assign with confidence to man? We have examined Sir Charles Lyell's work with great care in order to find some definite answer to this question. But nowhere does he reply to it in explicit terms. He, however, supplies us with some geological details which serve to carry back man's presence to a period startlingly remote.

If we understand him correctly, Sir Charles appears to think that the delta of the Mississippi is more available as a chronometer by which to measure the lapse of post-pliocene time than any means which have as yet been discovered or rendered available in Europe. In his *Travels in North America* he has shown that the deposits forming the delta and alluvial plain of the Mississippi consist of sedimentary matter, extending over an area of 30,000 square miles, and known in some parts to be several hundred feet deep. The time required for the formation of this delta he estimates to be "many tens of thousands of years, probably more than 100,000."

Buried under four cypress forests in this formation, a human skeleton was found some years ago, to which Dr. B. Dowler ascribes an antiquity of 57,000 years. In a more ancient alluvial deposit of the same formation near Natchez, and associated with bones of the mastodon and megalonyx, was discovered a human os innominatum, for which an age of many thou-

sand years has been claimed. As to the high antiquity of these bony remains of man, he thinks "it is allowable to suspend our judgment." But on the same page he continues :—

"If, however, I am asked whether I consider the Natchez loam, with land-shells and the bones of mastodon and megalonyx, to be more ancient than the alluvium of the Somme containing flint implements and the remains of the mammoth and hyena, I must declare that I do not. * * * * * * *. If the relative ages of the Picardy and Natchez alluvium were to be decided on conchological data alone, the fluvio-marine beds of Abbeville might rank as a shade older than the loess of Natchez. * * * *. If I was right in calculating that the present delta of the Mississippi has required, as a minimum of time, more than one hundred thousand years for its growth, it would follow, if the claims of the Natchez man to have coexisted with the mastodon are admitted, that North America was peopled more than a thousand centuries ago by the human race. But, even were that true, we could not presume, reasoning from ascertained geological data, that the Natchez bone was anterior in date to the antique flint hatchets of St. Acheul."

From all this, it is evident that Sir Charles thinks that the primitive men who fashioned and used the flint implements of Abbeville must have lived at least 100,000 years ago !

But our author goes even further than this in that part of his work devoted to the consideration of the glacial period in its chronological relations to man :—

"In order to form a connected view of the most simple series of changes in physical geography which can possibly account for the phenomena of the glacial period, and the period of the establishment of the present provinces of animals and plants, the following geographical states of the British and adjoining areas may be enumerated.

"First, a continental period, towards the close of which the forest of Cromer flourished ; when the land was at least 500 feet above its present level, perhaps much higher, and its extent probably greater than that given in the map.

"Secondly, a period of submergence, by which the land north of the Thames and Bristol Channel, and that of Ireland, was gradually reduced to such an archipelago as is pictured in map, Fig. 40 ; and finally to such a prevalence of sea as is seen in map, Fig. 39. This was the period of great submergence and of floating ice, when the Scandinavian flora, which occupied the lower grounds during the first continental period, may have obtained exclusive possession of the only lands not covered with perpetual snow.

"Thirdly, a second continental period when the bed of the glacial sea, with its marine shells and erratic blocks, was laid dry, and when the quantity of land equalled that of the first period."

"The first appearance of man, when, together with the mammoth and woolly rhinoceros, or with the *Elephas antiquus*, *Rhinoceros hemitœchus*, and *Hippopotamus major*, he ranged freely from all parts of the continent into the British area, belongs probably to a late portion of this second continental period.

"Fourthly, the next and last change comprised the breaking up of the land of the British area once more into numerous islands, ending in the present geographical condition of things."

"The time which it would require to bring about such changes of level, according to the average rate of 2½ feet per century, however vast, will not be found to exceed that which would best explain the successive fluctuations in terrestrial temperature, the glaciation of solid rocks, the transportation of erratics above and below the sea-level, the height of arctic shells above the sea, and last, not least, the migration of the existing species of animals and plants into their actual stations, and the extinction of some conspicuous forms which flourished during the post-pliocene ages. When we duly consider all these changes which have taken place since the beginning of the glacial epoch, or since the forest of Cromer and the *Elephas meridionalis* flourished, we shall find that the

phenomena become more and more intelligible in proportion to the slowness of the rate of elevation and depression which we assume.

"The submergence of Wales to the extent of 1400 feet, as proved by glacial shells, would require 56,000 years, at the rate of 2½ feet per century; but taking Professor Ramsey's estimate of 800 feet more, that elevation being required for the deposition of some of the stratified drift, we must demand an additional period of 32,000 years, amounting in all to 88,000; and the same time would be required for the re-elevation of the tract to its present height. But if the land rose in the second continental period no more than 600 feet above the present level, this 600 feet would have taken another 26,000 years; the whole of the grand oscillation, comprising the submergence and re-emergence, having taken, in round numbers, 180,000 years for its completion; and this, even if there were no pause or stationary period, when the downward movement ceased, and before it was converted into an upward one."

From these calculations we derive some idea of the age of the post-pliocene period. But this does not express the extreme age of man. To obtain this we must add to the number 180,000, the age of the pliocene era, which is probably as great, if not, indeed, greater. For Sir Charles thinks that "we may anticipate the finding of man's remains on some future day in the pliocene period."

Beyond this he ventures no further.

"We cannot," he says, "expect to meet with human bones in the miocene formations, where all the species and nearly all the genera of mammalia belong to types widely differing from those now living."

To this a writer in a recent number of the *Natural History Review* replies:—

"If man constitutes a separate family of the primates—and still more so, if he represents a special order—then, according to all analogy, there must have been some representatives of the family in miocene times."

Professor Huxley observes:—

"That the first traces of the primordial stock whence man has proceeded, need no longer be sought by those who entertain any form of the doctrine of progressive development in the newest tertiaries, but that they may be looked for in an epoch more distant from the age of the Elephas primigenius than that is from us."

And again he says:—

"Where then must we look for primæval man? Was the oldest *Homo Sapiens* pliocene or miocene, or yet more ancient? In still older strata do the fossilized bones of an ape more anthropoid, or a man more pithecoid than any yet known, await the researches of some unborn palæontologist?

"Time will show. But in the meanwhile, if any form of the doctrine of progressive development is correct, we must extend by long epochs the most liberal estimate that has yet been made of the antiquity of man."

The most liberal estimate of man's antiquity which we have been able to find, is that hazarded by the late Dr. Morton, not long before his death, in 1851.

"I have no doubt," he wrote, "that man will yet be found in the fossil state as low down as the Eocene deposits, and that he walked the earth with the Megalonyx and Paleotherium. His not having been hitherto discovered in the older stratified rocks, is no proof that he will not be hereafter found in them. Ten years ago the monkey tribes were unknown and denied in the fossil state; but they have since been identified in the Himalaya Mountain, Brazil, and England."[1]

[1] Types of Mankind, p. 326.

In a paper read before the Ethnological Society, of London, April 14, 1863, the president, Mr. Crawfurd, stated his—

"Conviction that the evidence which of late years had been adduced, giving to the presence of man on the earth an antiquity far beyond the usual estimate of it, is satisfactorily established, and that there can now be no question that man was a contemporary of animals, such as lions, hyenas, elephants and rhinoceroses, extinct far beyond the reach of human record."

"From the moment," writes M. Littré, "when man fashioned the stones to make himself implements, to the time when we see him erect temples and pyramids, and inscribe his monuments with hieroglyphics, a vast period must have elapsed. When the Egyptian priests conversed with Plato, and gave themselves an existence of ten thousand years, present investigators do not consider it an idle boast."[1]

M. Alfred Maury, in the *Revue des Deux Mondes*, says:—

"All doubts raised by geologists as to the exactness of Boucher de Perthes' observations must vanish. Man has indeed left the proofs of his existence at a period the antiquity of which cannot yet be calculated, but which contradicts all historical induction."

"Of all discoveries," writes M. Lartet, "proving the high antiquity of the human species in the west of Europe, the worked flints collected by Boucher de Perthes are the most conclusive evidence."[2]

Prof. Albert Gaudry, of the Paris Museum of Natural History, the author of several works on Palæontology, was sent to Amiens and Abbeville, in August, 1859. In his Report to the Academy of Sciences, read October 3, he concludes that—

"1. Man was the contemporary of the Rhinoceros tichorhinus, Hippopotamus major, Elephas primigenius, Cervus somonensis, and other extinct animals.

"2. The bed called by geologists the diluvium has been formed, partly at least, after the appearance of man. The formation has doubtless been the result of the great cataclysm."

D'Archiac believes that—

"The human race which has fashioned the flints of the diluvium of Abbeville and Amiens, had taken possession of that country at the time the British Islands were yet connected with the continent, since the separation of these isles had only been effected after the formation of the diluvian banks where the implements are found. As the formation of these diluvian banks was one of the consequences of the last Alpine dislocations, the same human race must have existed before Central Europe had attained its actual orographic state. The apparition of man in the *Western regions of Europe* must therefore date from an epoch when the surface of that continent must have been considerably different from what it is now.

"We arrive inevitably at the conclusion, that the terrestrial population of our continent has passed through all the so-called critical phases of the long quaternary period so variously affected by geological phenomena. If the persistence of species and the continuation of habitat has been possible for animals of all kinds, it must have been equally possible for man their contemporary, placed in the same circumstances. Why should there have been a biological intermission as regards man only when it is demonstrated that there was none in the animal species."[3]

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[1] Revue des Deux Mondes, 1858.

[2] Extract from a note presented by M. E. Lartet to the Académie des Sciences, March 19, 1860, on the "Geological Antiquity of the Human Race in Western Europe." See also Comptes Rendus for April 19, 1860.

[3] Bulletin de la Soc. Geol., t. x.

In a letter addressed to a friend, M. Ed. Collomb thus expresses his opinion in reference to the antiquity of man:—

"The thesis I purpose sustaining is that of the existence of man prior to the existence of the old glaciers. In my view, man existed at the commencement of the quaternary period, and was the contemporary of the Elephas primigenius, the Rhinoceros tichorhinus, the Ursus spelæus, etc., and many other extinct species, which are only found in the deposits immediately preceding the tertiary series.

"The remains of human industry in the valleys of the Somme, Seine, etc., correspond with the inferior diluvium of the valley of the Rhine, a deposit which is much anterior to the ancient glaciers of the Vosges, as it is separated from them by the middle diluvium of the Rhine, or the red diluvium of the valley of the Seine."[1]

M. Gaudin, who has carefully studied the flora which existed at the period when the great mammals became extinct, concludes from his investigations that—

"The major portion of the vegetable population of our continent has traversed all the phases of the quaternary period, and that man could thus have existed as well as the vegetable world of our continent."[2]

In his address before the meeting of the British Association held at Oxford in 1860, Lord Wrottesly said:—

"Another independent proof of the great age of the gravel on the banks of the Somme, is derived from the large deposit of peat, the oldest portion of which belongs to times far beyond those of tradition; yet distinguished geologists are of opinion the growth of all the vegetable matter, and even the original scooping out of the hollows, are events long posterior in date to the gravel with flint implements, nay, posterior even to the formation of the layers of loam with fresh-water shells overlying the gravel."

"It becomes daily more probable," writes Agassiz, "that facts will force us, sooner or later, to admit that the creation of man lies far beyond any period yet assigned to it, and that a succession of human races, as of animals, have followed one another upon the earth."[3]

The above quotations (and others might readily be cited from the works of De Saulcy, Pouchet, Gosse, Murchison, Waitz, Broca, and others) are reproduced here because they show how marked is the present tendency of scientific research to push the origin of man back, very far back into the dim mysterious night of time.

Up to the time of the publication of Lyell's work, not a single human bone had been discovered in the alluvial sand and gravel of the Somme, although many hundred flint implements and many thousand knives had been collected from this locality.

"This dearth of the mortal remains of our species," writes Sir Charles, "holds true equally, as yet, in all other parts of Europe where the tool-bearing drift of the post-pliocene period has been investigated in valley deposits. Yet in these same formations there is no want of bones of mammalia belonging to extinct and living species. In the course of the last quarter of a century, thousands of them have been submitted to the examination of skilful osteologists, and they have been unable to detect among them one fragment of a human skeleton, not even a tooth. * * * * * That ere long, now that curiosity

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[1] "On the Existence of Man prior to the Apparition of the Ancient Glaciers." Bibliothèque Univ. de Genève, t. viii. 1860.

[2] "On the Contemporary Vegetation of Primitive Man." Letter by C. I. N. Gaudin to Prof. Alph de Candolle; Bibliothèque Univ., t. viii. 1860.

[3] The Tertiary Age and its characteristic mammals. Atlantic Monthly, Sept. 1863, p. 339.

has been so much excited on this subject, some human remains will be detected in the older alluvium of European valleys, I confidently expect."

A few days after reading the above paragraph we received two numbers of *L'Abbevillois*, a French newspaper published at Abbeville, tri-weekly. These numbers contain an account of the proceedings of the Imperial Society of Emulation of Abbeville, at the sitting held April 16th, 1863. At that meeting M. Boucher de Perthes, the president, announced to the Society that on the 28th of March last, he had discovered and extracted with his own hands from the bed of black, argillaceous sand composing the diluvial bank of Moulin-Quignon,[1] one-half of a human, fossil, lower jaw, containing a penultimate molar, and which at first sight appeared to him to exhibit some difference from the jaw of the present race of men.[2] This bony fragment was found at the depth of four mètres and fifty-two centimètres, in the deposit known as the "black seam flinty gravel," so-called from its bluish-black colour which is produced by the oxides of iron and manganese. This deposit immediately overlies the chalk, being separated from it by a thin layer of black mangano-ferruginous clayey matter. It is one of the oldest of the Somme Valley beds, and belongs to what Mr. Prestwich calls the "high level" series.

At the distance of a few centimètres, and also buried in the black earth, was found a flint hatchet, which was disengaged from the bank by M. Oswald Dimpre. Drs. Dubois and Hecquet and M. de Villepoix, members of the Society of Emulation, pronounced the fragmentary jaw to be undoubtedly fossil, and somewhat different in conformation from the jaw of recent man. On the 10th of April, Abbeville was visited by M. l'Abbe Bourgeois, Professor of Philosophy and Natural History in the College of Pont-le-Voie; on the 14th by Drs. Carpenter, Felix Garrigou, and Falconer, and on the 15th by M. de Quatrefages, of Paris. These gentlemen, after examining carefully the bank, concluded that it was an undisturbed deposit (*vierge ou non remanié*), and confirmed the above opinion concerning the maxillary fragment.

On the 15th of April, M. de Perthes discovered in a layer of yellow sand of the same bank, and at the depth of 3½ mètres from the surface, two osseous fragments which Falconer and Quatrefages immediately recognized as belonging to the tooth of a mammoth (Elephas primigenius).

In the early part of April M. de Perthes collected a quantity of bones in a gravel-pit at Menchecourt at the depth of 8 metres. Among these he discovered a fragment of a human jaw and six detached teeth, which Dr. Falconer considered to be fossil, and to approach more closely to that of existing man than the jaw discovered at Moulin-Quignon.

"On the 16th of April Dr. Carpenter communicated a short paper to the Royal Society, supporting the authenticity of the discovery of the jaw at Moulin-Quignon; and during the debate, Dr. Falconer, in the absence of Dr. Carpenter and himself, was unauthorizedly cited as entertaining the same opinion. On the 20th of April M. de Quatrefages communicated to the 'Academy of Sciences' a note by M. Boucher de Perthes, followed by descriptive remarks by himself, conveying the high authority of his opinion in favour of the jaw being a true fossil of geological antiquity. On the 18th of April Dr. Falconer, immediately after his return to London, commenced the deliberate scrutiny of

[1] The bank of Moulin-Quignon is located upon a plateau overlooking the valley, and is thirty mètres above the level of the Somme and of the sea.

[2] A lithographic sketch of this jaw, illustrating a paper by Alfred Tylor, "On the discovery of supposed human remains in the tool-bearing drift of Moulin-Quignon," will be found in the first number of the London Anthropological Review.

the materials which he had brought with him from Abbeville, and on the 21st, in conjunction with, or aided by, Mr. John Evans, Mr. Prestwich, Mr. Busk, and Mr. Tomes, he arrived at results opposed to the authenticity alike of the 'detached molar' of the jaw, and of the flint *hâches*. That day, without the delay of a post, he communicated his suspicions to M. Lartet, requesting him to make them, and the grounds upon which they were founded, known to M. de Quatrefages. But the latter had already given in his affirmative memoir to the 'Institut' on the previous day (20th), followed on the 27th of April and 4th of May by successive notes in the same sense. On the 25th of April a letter by Dr. Falconer, written before he was aware of M. de Quatrefages' first communication appeared in the *Times*, questioning the authenticity of the 'jaw' and of the *hâches*. Men of science in France and England were thus suddenly placed at direct issue on a grave and important point of great general interest. But, happily, from the frankness and rapidity of the communications interchanged, there existed the most cordial relations, and the conviction of loyalty and good faith on both sides. The French *savants*, the more they went into the case were the more convinced of the soundness of their conclusions; while their English opponents, the more they weighed the evidence before them were the more strengthened in their doubts. As a wordy discussion would but have wasted time and must have been protracted, and as a personal conference held out the best prospect of a speedy settlement of the question, a '*réunion*' of men of science, to be held at Paris, was proposed by the French *savants*."[2]

In accordance with this proposition, an English deputation, composed of Drs. Falconer and Carpenter, and Prof. Busk, arrived at Paris on the 9th of May, and were joined by Mr. Prestwich the next day. The French members of the commission, thus assembled for the "trial of the jaw," were MM. de Quatrefages, Lartet, Delesse, and Desnoyers. These gentlemen were assisted by MM. L'Abbé Bourgeois, Gaudry and Alphonse Milne-Edwards. M. Milne-Edwards, the eminent zoologist and member of the Institute, presided over the conference. MM. Buteux, Daubrée, Delanoue, Dimpre, Hébert, de Vibraye, Garrigou, Vaillant, Bert, and Marcotte were also present at the conference. *Séances* were held at Paris on the 9th, 10th, and 11th of May, and on the 12th and 13th at Abbeville.

After much careful investigation and protracted discussion, the following conclusions were put to the vote by the President, in order to test the opinions of the different members present.

1. The jaw in question has not been introduced surreptitiously into the quarry of Moulin-Quignon. It existed previously in the situation in which it was found by M. Boucher de Perthes, on the 28th of March last. This conclusion was unanimously adopted.

2. Everything conduces to the idea that the *dépôt* of this jaw is contemporaneous with that of the flints and other materials which constitute the argilo-gravelly mass known as the "*couche noire*," and which rests directly upon the chalk. This conclusion was adopted by all the members present, except MM. Falconer and Busk, who reserved their opinion until more ample information was obtained.

This resolution, it will be seen, admits that the jaw is of the same age as the Moulin-Quignon gravels. But the age of these gravels is itself in dispute. Mr. Prestwich regards them as belonging to the "high level" series, or most ancient of the quaternary deposits of the Somme Valley. M. Elie de Beaumont, on the contrary, refers them to his "*dépôts meubles sur des pentes*," as superficial modern deposits of the age of the peat beds.[2]

3. The worked flints, in the form of hatchets, which were exhibited at

[1] See Natural History Review for July, 1863, p. 425.

[2] For a succinct account of M. de Beaumont's views, see Medical Times and Gazette for August 29th, 1863, p. 237.

the *réunion* as having been found about the same time in the lower part of the quarry of Moulin-Quignon, are nearly all authentic. All the members accepted this conclusion except Mr. Falconer, who withheld his opinion until more information was obtained.

4. There is no sufficient reason for doubting that the *dépôt* of the hewn flints is contemporaneous with that of the jaw found in the "black seam." All the members gave their assent to this conclusion except MM. Falconer and Busk, who reserved their opinion for the present.

According to this resolution, if we adopt the view of Mr. Prestwich, both the *haches* and the jaw belong to the old quaternary period. If M. Elie de Beaumont's view be correct, they are both as modern as the Gallo-Roman period. In M. Hébert's opinion, they belong to an age between these two.

MM. Busk and Falconer have placed upon record the following written statements of their opinions concerning the antiquity of this famous jaw.

"ABBEVILLE, May 13, 1863.

Mr. Busk desires to add, that although he is of opinion, judging from the *external* condition of the jaw, and from other considerations of a more circumstantial nature, that there is no longer reason to doubt that the jaw was found in the situation and under the conditions reported by M. Boucher de Perthes, nevertheless it appears to him that the *internal* condition of the bone is wholly irreconcilable with an antiquity equal to that assigned to the deposits in which it was found."

"ABBEVILLE, May 13, 1863.

"I am of opinion that the finding of the human jaw at Moulin-Quignon is authentic; but that the characters which it presents, taken in connection with the conditions under which it lay, are inconsistent with said jaw being of any great antiquity. "H. FALCONER."

In a work published in five volumes, at Paris in 1838, and entitled *De la Creation et Progression des Êtres*, M. de Perthes announced his belief that, sooner or later, traces of the existence of primeval man would be discovered. On page 5 of the second volume of his *Antiquités Celtiques*, he says:—

"I had for a long time foreseen the existence of this antediluvian race, and for many years anticipated the pleasure I should enjoy, when in these deposits, which geology has so often declared barren, and of an epoch anterior to man, I should at last discover the proofs of his existence, if not the fossil bones in the remains of his works."

In 1847 he declared his conviction that the worked flints, then so rare, and regarded with so much incredulity, would be found, in course of time, in many localities and in great numbers. The same statement he thought would prove true of human fossils, and, as we have seen above, he even ventured the opinion, that the bony remains of man, when found, would exhibit some differences in conformation from those of the present day. The discoveries above described, and events which are daily transpiring, certainly seem to lend confirmation to these prophetic announcements of the veteran archæologist.

III. We turn now, in the course of our rapid survey, to another phase of ethnological inquiry. Where stands man in the order of created things? What is his position, and what are the relations which he bears to the universe without and about him?

Every one, at all conversant with the scientific discussions of the day, knows that this question of questions for mankind, as Professor Huxley calls it, this problem which underlies all others, and is more deeply in-

teresting than any other, has lately become an important "bone of contention" between the distinguished anatomist just named and Professor Owen. Orally, at the meetings of the British Association, and also in print, these two gentlemen have carried on this discussion with great vigour. In his able and interesting work, now before us, Prof. Huxley presents us with a *résumé* of his views upon the subject-matter of this debate. This work is divided into three parts. The first treats of the natural history of the man-like apes; the second, of the relations of man to the lower animals; and the third, of some remains of fossil man.

A moment's reflection will suffice to show that the study of man's position in the animate world is to a great extent an inquiry simply into the anatomical and physiological relations which he bears to the anthropomorphous creatures immediately below him in the zoological scale.

Lawrence long ago said:—

"As the monkey-race approach the nearest to man in structure and actions, and their forms are so much like the human as to have procured for them the epithet *anthropomorphous*, we must compare them to man, in order to find out the specific characters of the latter; and we must institute this comparison particularly with those called orang-outangs."[1]

Now this is what Huxley has done with marked ability. Having shown that man and the monkeys are identical in the physical processes by which they originate, identical in the early stages of their formation, identical in the mode of their nutrition before and after birth; he next attempts to demonstrate that a marvellous likeness of organization is exhibited in their adult and perfect structure. He points out how man resembles the monkeys as they resemble one another; and how he differs from them as they differ from one another. Premising that the ape, which most nearly approaches man, in the totality of its organization, is either the chimpanzee or the gorilla; he selects the latter, and having determined the value and magnitude of the differences between it and man, he compares these critically with those which separate the gorilla from other animals of the same order. Our space will not permit us to follow Prof. Huxley through the details of this double comparison. We can present our readers with his conclusions only. These conclusions are as follows:—

That, in whatever proportion of its limbs the gorilla differs from man, the other apes depart still more widely from the gorilla, and that, consequently, such differences of proportion can have no ordinal value; that in respect to the number of ribs, the number of dorsal and lumbar vertebræ, the curves of the vertebral column, the proportional length of the spines of the cervical vertebræ, &c., there is no doubt whatsoever as to the marked difference between man and the gorilla; but there is as little, that equally marked differences, of the very same order, obtain between the gorilla and the lower apes; that the difference in the volume of the cranial cavity of different races of mankind is far greater, absolutely, than that between the lowest man and the highest ape, while, relatively, it is about the same; that the cranial capacities of some of the lower apes fall nearly as much, relatively, below those of the higher apes, as the latter fall below man; that what is true of the leading characteristics of the skull holds good of all minor features; so that for every constant difference between the gorilla's skull and the man's, a similar constant difference of the same order (that is to say, consisting in excess or defect of the same quality) may be found

[1] Lectures on Comparative Anatomy, Physiology, Zoology, and the Natural History of Man. London, 1848, p. 88.

between the gorilla's skull and that of some other ape; that, for the skull, no less than for the skeleton in general, the proposition holds good, that the differences between man and the gorilla are of smaller value than those between the gorilla and some other apes; that while the teeth of the gorilla closely resemble those of man in number, kind, and in the general pattern of their crowns, they exhibit marked differences from those of man in secondary respects, such as relative size, number of fangs, and order of appearance; that if the teeth of the gorilla be compared with those of an ape, no further removed from it than a *Cynocephalus*, or baboon, it will be found that differences and resemblances of the same order are easily observable; but that many of the points in which the gorilla resembles man are those in which it differs from the baboon; while various characters in which it differs from man are exaggerated in the *Cynocephalus;* that in short, not to go more closely in detail, greatly as the dentition of the highest ape differs from that of man, it differs far more widely from that of the lower and lowest apes; that whatever part of the animal fabric—whatever series of muscles, whatever viscera might be selected for comparison—the result would be the same—the lower apes and the gorilla would differ more than the gorilla and the man.

Many well-attested anatomical facts are brought forward by Professor Huxley in support of the above conclusions. He points out also the relation to this subject of certain characters of the hand, the foot, and the brain, about which much error has found its way into the books. Man is generally said to be *bimanous*, or to possess two *hands* terminating his forelimbs or upper extremities, the terminations of his hind limbs or lower extremities being *feet*. All the apes, on the contrary, are said to be *quadrumanous*, or to have hands alone at the ends of both fore and hind limbs. It has been affirmed, too, that the brain of man differs from that of the apes in possessing the posterior lobe, the posterior cornu of the lateral ventricle, and the hippocampus minor. These statements Professor Huxley attacks with great vigour, and endeavours to show that they are wholly inadmissible. From a careful comparison of the human foot and hand, it is evident that the foot is distinguished from the hand by the following absolute anatomical differences: 1. By the arrangement of the tarsal bones. 2. By having a short flexor and a short extensor muscle of the digits. 3. By possessing the muscle termed peronæus longus. To determine whether the terminal division of a limb in any of the primates is a foot or hand, we have only to ascertain whether the above characters are present or absent. The hind-limb of the gorilla examined with reference to these features, is found to end in a true foot, with a very movable great toe. A prehensile foot, indeed, it is, but in no respect a hand. From the foot of man it differs in no fundamental character, but merely in proportions, in the degree of mobility, and in the secondary arrangement of its parts. The more carefully we examine the hand and foot in the various apes, the more evident is it, that they differ to a greater extent from those of the gorilla, than the gorilla's hand and foot do from man's.

With regard to the brain, Prof. Huxley shows that so far from the posterior lobe, the posterior cornu and the hippocampus minor, being structures peculiar to, and characteristic of man, as they have been over and over again asserted to be, it is precisely these structures which are the most marked cerebral characters common to man with the apes. He asserts that they are among the most distinctly simian peculiarities which the human organism exhibits. The posterior cornu and the hippocampus minor have

now been seen—usually, at least as well-developed as in man, and often better—not only in the chimpanzee, the orang, and the gibbon, but in all the genera of the old world baboons and monkeys, and in most of the new world forms, including the marmosets. As to the convolutions, the brains of the apes exhibit every degree of development, from the almost smooth brain of the marmoset, to the orang and the chimpanzee, which fall but little below man.

"So far as cerebral structure goes, therefore, it is clear that man differs less from the chimpanzee or the orang, than these do even from the monkeys, and that the difference between the brains of the chimpanzee and of man is almost insignificant, when compared with that between the chimpanzee brain and that of a lemur. * * * * *

"Regarded systematically, the cerebral differences of man and apes are not of more than generic value—his family distinction resting chiefly on his dentition, his pelvis, and his lower limbs." * * * * * *

"I have endeavoured to show that no absolute structural line of demarcation, wider than that between the animals which immediately succeed us in the scale, can be drawn between the animal world and ourselves; and I may add the expression of my belief that the attempt to draw a psychical distinction is equally futile, and that even the highest faculties of feeling and of intellect begin to germinate in lower forms of life. * * * * * * *

"But if man be separated by no greater structural barrier from the brutes than they are from one another, then it seems to follow that if any process of physical causation can be discovered by which the genera and families of ordinary animals have been produced, that process of causation is amply sufficient to account for the origin of man. In other words, if it could be shown that the Marmosets, for example, have arisen by gradual modification of the ordinary Platyrhini, or that both Marmosets and Platyrhini are modified ramifications of a primitive stock, then there would be no rational ground for doubting that man might have originated, in the one case, by the gradual modification of a man-like ape; or, in the other case as a ramification of the same primitive stock as those apes."

As intimated above, the cerebral structure of man and the apes has, for several years past, been the subject of a controversy which has been carried on so vehemently as to have become memorable in the annals of comparative anatomy. In an anthropological point of view this controversy is of the utmost importance, inasmuch as it involves the precise position of man in systematic classification. The great Linnæus placed *Homo* in the order *Primates* with the rank of a genus. Blumenbach and Cuvier separated man from the monkeys, and placed him in the order *Bimana*. In 1856, Isidore G. St. Hilaire declared this order "to have become obsolete."[1] From the anatomical reasons just stated, Huxley concludes that Linnæus, the great lawgiver of systematic zoology, was correct, and that a century of anatomical research brings us back to his conclusion, that man is a member of the same order (for which the Linnæan term *Primates* ought to be retained) as the apes and lemurs. This order Prof. Huxley divides into seven families of "about equal systematic value," namely—

1. *Anthropini*, containing man alone.
2. *Catarhini*, " the old world apes.
3. *Platyrhini*, " all the new world apes, except the marmosets.
4. *Arctopithecini*, " the marmosets.
5. *Lemurini*. " " lemurs.
6. *Cheiromyini*, " " cheiromys.
7. *Galeopithecini*, " " galeopithecus.

[1] Histoire Naturelle Générale des Régnes organiques. Paris, t. ii. 1856.

In 1857, Prof. Owen astonished the scientific world by announcing that he had been led by purely anatomical considerations to separate man from the other Primates, and from the mammalia generally as a distinct *sub-class*. He affirmed in reference to the brain that the posterior lobe, the posterior horn of the lateral ventricle and the hippocampus minor were peculiar to man; and upon these cerebral characters he erected his sub-class and called it Archencephala. This remarkable statement, so utterly without foundation in fact, at once brought him into collision with all preceding and contemporary anatomical authority. According to Gratiolet, as the order in which the cerebral convolutions develop themselves is different in man and the apes, the question must be settled by reference to embryology and morbid anatomy.

Whether man be one or many in origin, whether he first appeared upon earth four thousand or very many times four thousand years ago, and whether he constitutes, in natural classification, a distinct sub-class of the mammalia (the *Archencephala* of Owen), or a separate order, or forms merely a family, as Huxley maintains, in the great Linnæan order of the Primates, are manifestly, from all that has been said, inquiries of the most profound and curious interest. The question of the origin of man, as we have elsewhere maintained, and this is true also of the associated questions, is necessarily involved in that broader inquiry, the origin of all organic forms, and of life itself.[1] The problem, to the elucidation of which Darwin, Wallace, J. D. Hooker, and others are devoting themselves with such signal ability, as the severely satirized Lamarck and the transcendental Geoffroy Saint Hilaire long since did, must first be solved before the ethnologist can make the least satisfactory advance towards clearing up this perplexing subject. We need not wonder, therefore, why Sir Charles Lyell, in discussing the antiquity of man, devotes so large a portion of his elaborate work to the consideration of the theories of progression and transmutation in general, and especially to Darwin's theory of the origin of species by variation and natural selection. It is daily becoming more and more evident, that the origin of man, his antiquity, and his relation to the lower animals, all resolve themselves, as scientific questions, into the larger question of the tenability or untenability of Mr. Darwin's view. Although Sir Charles, with his usual caution, nowhere in his work expresses himself in decided support of these views, yet to the careful reader it is quite evident that the whole course of his argument is favourable to the theory of Darwin. Wanting the indispensable aid of the comprehensive facts upon which the generalizations of Darwin are based, it is not at all wonderful that Kant and Schiller, Prichard and Morton, and all others who have attempted to settle definitely the original unity or diversity of man, should have utterly failed. Innumerable and very rich are the detailed facts and observations of science. Through long centuries a numerous and industrious band of scientists have been occupied in chronicling them; and yet the veil of Isis still shrouds from mortal sight the manner and the time in which life and its varied forms first animated the globe. Indeed, science, through one of her distinguished sons, asserts the impossibility of denying positively that life, connected with some form, was not co-eternal with time, space, and matter.[2]

From the foregoing statements, it will be seen that the ethnology of the

[1] The Cranial Characteristics of the Races of Men in Indigenous Races of the Earth, p. 349.

[2] Dr. Joseph Leidy, Description of Remains of Extinct Mammalia, Journal Acad. Nat. Sciences, N. S., iii. 167.

present day is a science of polemics as well as of observation. It is at this moment in very much the same condition as was astronomy in the days of Galileo, or geology in the time of Hutton, or palæontology in that of Palissy. While yet in the infantile phase of its career, it is passing through the same fiery ordeal from which geology has but just emerged. During the animated discussions of which it has been and is still being made the subject, much talent and very diversified learning, however, have been brought to bear upon the obscure points of the science, in some respects, with happy results. Nevertheless, it is an acknowledged fact, and one much to be regretted, that, in the course of the controversy, by skilful but disingenuous appeals to popular prejudices, some of the combatants, more desirous of establishing certain favourite doctrines than anxious to engage in the slow and toilsome work of investigating the facts by which such doctrines must ultimately stand or fall, have greatly disparaged the zoological study of man and its honest and laborious cultivators.

However, during the past seventy years, many valuable observations have been made and placed upon record by Blumenbach, Soemmering, Prichard, Sandifort, Retzius, Eschricht, Nillson, Van der Hoeven, Morton, Davis, Thurnam, Wilde, Foville, Gosse, Minchin, Boudin, Blanchard, Engel, Zeune, Carus, Virchow, Lucæ, Fitzinger, Hnschke, Von Baer, Williamson, Wilson, Pickering, and many others whom we might readily mention. To such investigators is chiefly due all actual progress in ethnology. They have confined themselves to original research in the different departments of the science under consideration, fully impressed with the idea that the legitimate work of the ethnologist, at present, is to accumulate facts, carefully sifting these, and separating the true from the doubtful and the false. For in this way only can the first principles of the natural history of man be determined, and its students obtain that favourable ground upon which alone they can successfully grapple with those ultimate questions whose solution, for want of the proper data, cannot yet be undertaken with any hope of success.

In view of these facts it will be seen, then, that the interests of ethnology are better cared for by examining the earliest historical and monumental records of human races, as Rosellini, Lepsius, Birch, Bonomi, Botta, Rawlinson, Layard, Kingsborough, and many others have done, with the view of ascertaining the physical characters which they exhibited in those remote times, their affiliations and amalgamations with each other; by studying the bony and industrial remains of man found in ossuaries and mounds, or buried in the earth, as Boucher de Perthes, Rigollot, Wilson, Davis, and others have done with so much success; by observing and collating the phenomena of hybridity after the manner of Kolreuter and Gärtner, and using these to elucidate the laws of human hybridism, as M. Broca[1] is now so ably doing; by applying, as Draper[2] is so philosophically attempting to do, the laws of embryology so well elaborated by Wolff, Von Baer, Coste, Rudolph Wagner, and others, to the explanation, not of the physical and intellectual development of the individual only, but also of the rise, progress, decay, and death of nations; by studying, after the example of

[1] His valuable papers on the subject of Hybridity may be consulted in Brown-Séquard's Journal de la Physiologie, Nos. 5, 6, 7, 8 and 10.

[2] In addition to his elaborate and eminently philosophical work, the title of which is quoted above, see chapters 4, 7, and 8, of his Human Physiology, and his remarkable paper read at the meeting of the British Association, held at Oxford, and entitled, "On the Intellectual Development of Europe, considered with reference to the views of Mr. Darwin and others, that the Progression of Organisms is determined by Law."

Boudin,[1] the geographical distribution of man, and the circumstances which influence this distribution, and the adaptation of different races to different climatic zones; by investigating philology in accordance with the able methods of Renan, Pott, Maury, Castrén, and others; by following the inquiries of Blumenbach,[2] Courtet de Lisle,[3] Pulszky,[4] and others, into the iconographic tendencies of the races of men; by studying the forms of the head, and other parts of the body, with reference to the embryonic and youthful forms of these parts, in the manner indicated by Knox,[5] Jaeger,[6] and others; and, lastly, by extending, as so many excellent observers have already done, our inquiries as much as possible into the anatomical, physiological, moral, and intellectual peculiarities of the existing races of men, in all parts of the earth.

Only by investigations of the profound and comprehensive character here indicated, can the true meaning of man's advent upon earth be fathomed, and the relations which he bears to the animal, vegetable and mineral productions about him, and the social and governmental relations of the different races of men, be understood. In this teeming field, as yet but imperfectly explored, must be sought those facts which are absolutely necessary to crown with success the philosophical, though still feeble, efforts recently made in France by Count de Gobineau,[7] in England by Buckle,[8] and in America by Draper, to demonstrate the laws, in accordance with which different nations, starting from apparently the same point, soon diverge and attain, through varying degrees of development, unequal degrees of civilization, from which they degenerate, and finally become extinct, in a manner in many respects parallel with the decay and death of nature's organic forms.

The scantiness and uncertainty of ethnological facts are not the only obstacles to the demonstration of these laws. The want of a strictly philosophical method is a still more serious difficulty with which the ethnologist is forced to contend. Prior to the time of Goethe, that profound thinker in science, it is well known that comparative anatomy had no existence as a philosophical study, but was simply a mass of details of uncertain relations and obscure import. When the illustrious German announced his views of the metamorphosis of skeleton forms, and endeavoured, by conceiving and demonstrating the vertebral theory of the skull, to show the unity which pervades and dominates over the plurality of skull forms, comparative anatomy began at once to assume its proper status as a philoso-

[1] Traité de Géographie et de Statistique Médicales, etc. Paris 1857. See also an excellent article, contributed by the same author to the Journal de la Physiologie No. 10, and entitled "Du Non-Cosmopolitisme des Races Humaines."

[2] Specimen Historiæ Naturalis Antiquæ Artis Operibus illustratæ eaque vicissim illustrantis, published at Göttingen, in 1808. See also an unpublished lecture, delivered in Göttingen, March 19, 1823, noticed in the Göttingen Gelehrte Anzeigen for that year, and entitled, "De veterum artificium anatomiæ peritiæ laude limitanda, celebranda vero eorum in charactere, gentilitio experimendo accuratione."

[3] Tableau Ethnographique du Genre Humaine. Paris, 1849.

[4] Iconographic Researches on Human Races and their Art, in Indigenous Races of the Earth.

[5] Contributions to the Philosophy of Zoology, with special references to the Natural History of Man. London Lancet, Oct., Nov., and Dec., 1855.

[6] Ueber die bei verschiedenen Völkern gebräuchliche künstliche oder gewaltsame Veränderung der Form des Kopfes und anderer Körpertheile. Von Dr. J. G. J. Von Jäger.

[7] Essai sur l'Inegalité des Races Humaines. Par M. A. de Gobineau. Paris, 1853.

[8] History of Civilization. By Henry Thomas Buckle.

phical science. The idea of Goethe, that all animal forms are essentially modifications of one and the same type, was gradually recognized as the ruling method of comparative anatomy, and under some one or other of its constituent formulæ, such as the correlation and subordination of parts, the division of labour in the animal organism, &c., has been productive in the hands of Geoffroy St. Hilaire, Von Baer, Cuvier, Milne-Edwards, Owen, and others, of such fruitful results. In like manner, botany was but an unmeaning registration of facts, until Goethe, in his *Metamorphoses of Plants*, made the world understand that the remarkable assertion of Linnæus, "Principium florum et foliorum idem est," embodied the germs of the true botanical method. By demonstrating as far as could be done, in his day, the developmental relation of the leaf to the entire tree, he gave to vegetable physiology a guiding principle whose importance has been freely acknowledged by Kiesser, Voigt, Nees von Esenbeck, Sprengel, and other eminent botanists. As with anatomy and botany, so with general physics and chemistry, no real advancement was made until the facts of these sciences were severally studied with reference to the methods which were worked out by Newton for the one, and Lavoisier for the other. The true method of research which rules in ethnology, and the demonstration of which is necessary to place this science upon a philosophical basis, has yet to be discovered. In its absence the co-ordination of the details of the natural history of man, and their reduction to a few broad and leading generalizations, have been attempted in vain. Years ago it was, and with some it still is the custom to interpret these details in accordance with certain theological dogmata. Others, again, with more success have applied to them the zoological method. But the conviction is daily gaining ground that this method of itself is insufficient for the great objects of ethnology, comprising, as this science does, two intimately connected groups of facts—the one physical and the other psychical.

It has long been seen that the old, ethnological societies of Paris and London were too limited in their scope to be able to seize upon the fundamental idea of ethnology as a philosophical study. The labours of both were directed mainly to the accumulation of facts. The Parisian society published two valuable volumes of memoirs, and then became extinct some years ago. The London society, after publishing four volumes, fell into a state of inactivity from which it has recently been aroused by the increasing interest manifested by scientific men in the subject, for the cultivation of which it was organized. A new volume just issued marks this happy revival. But ethnology is, after all, a branch only of anthropology. M. Broca, in a letter addressed to Dr. James Hunt, the President of the Anthropological Society of London, has well said that "to give to the study of man all its development, to create a veritable science, it is necessary to regard it under every point of view, and bring to bear at the same time the resources of anatomy, physiology, hygiene, ethnology, philology, history, archæology, and palæontology."

Such are the objects to be accomplished by the Anthropological Societies recently formed in Paris and London by some of the most distinguished *savants* of those cities, and the Anthropological Congresses organized in Germany through the instrumentality, chiefly, of Wagner and Von Baer. For the successful prosecution of their important labours these associations have our earnest wishes, and we heartily respond to the hope of M. Broca, "that after the conclusion of the American crisis, the *savants* of the United States will, in their turn, experience the desire to organize a society of anthropology." J. A. M.

BIBLIOGRAPHICAL NOTICES.

ART. XVI.—*Transactions of American Medical Societies—*

1. *Medical Communications, with the Proceedings of the Seventy-first Annual Convention of the Connecticut Medical Society, held at Rockville, May 27 and 28, 1863.* 8vo. pp. 130.
2. *Extracts from the Records of the Boston Society for Medical Improvement, with Papers read before the Society.* By FRANCIS MINOT, M. D., Secretary of the Society. Vol. V. No. 1. From Jan. 13, 1862, to May 11, 1863, both dates inclusive. 8vo. pp. 116.

1. THE seventy-first annual convention of the *Connecticut Medical Society* was opened with an able address from its president, Dr. J. G. Beckwith, of Litchfield, on the moral dignity and grandeur of the medical profession—showing its connection with civilization, political economy, and with all the enduring and substantial interests of national welfare and greatness; with a glance at the intellectual and moral endowments and the education necessary to qualify the physician for the discharge of the duties of his profession in the times and under the circumstances in which we live. Whether considered in reference to the very comprehensive, but at the same time succinct and clear historical sketch which it presents of the rise and progress of medicine as an art and science, or the views it advocates in respect to the natural and educational qualifications of the physician and the high code of ethics to which he owes constant obedience, the address of Dr. Beckwith speaks favourably of the talents and acquirements of its author, and furnishes much to interest and instruct his professional contemporaries.

The address is followed by a dissertation on Logic applied to Medicine, read before the convention by Dr. James C. Jackson, of Hartford. The author, by a very satisfactory course of reasoning, has endeavoured to point out the method we must adopt in our observations, investigations, and conclusions, in order that our theorems and problems may become more clearly intelligible, and that we may arrive at experimental truths and definite laws in our department of science, as well as scientific principles of practice. To show, in other words, that in medicine it is necessary for a thorough comprehension of all its details and bearings, and to render it in the highest degree practical for the conservation of the public health and for the cure of disease, that we should go beyond mere observation and empirical teachings to a higher and more thorough conception of medicine as a science.

The next article in the communications before us, is a Vindication of Army Surgeons, by Ashbel Woodward, M. D., Surgeon 26th Regiment Connecticut Volunteers. Among the host of surgeons who have been suddenly called to the performance of military duties, in the immense armies which the rebellion have caused to spring up, there were doubtless at first, many, and it is possible that there may still remain some who are incompetent for the important services required of them. But that our army surgeons, taken as a body, are amenable to the sweeping charge of gross incompetency which has been preferred against them by those who have but an imperfect conception of the duties of army surgeons, and of the very great difficulties under which those duties must necessarily be performed, we do not believe. With Dr. Woodward we have good reason to conclude that the larger proportion of the gentlemen at present connected with the medical staff of the army are surgeons of science and skill, capable of discharging with credit to themselves, and advantage to the service, the arduous duties which devolve upon them. Among these are included some of the most distinguished and

competent members of the medical profession, who, impelled by motives of patriotism and humanity, have left the enjoyments, comforts and profits of domestic life to minister to our suffering soldiers in the field. The charge of incompetency brought against our military surgeons has been based, in part, upon the large number of operations, involving the loss of limb, which have been, unnecessarily as it is supposed, performed by them. Without stopping to inquire how far the accusation is well founded, we would merely remark, that on the field of battle and in the temporary hospitals necessitated in the course of an active campaign, extending over a large tract of country, and in which heavy forces on each side are engaged, there is little opportunity for the exercise of conservative surgery. Many a limb and even life have necessarily to be sacrificed, which could readily have been saved, were it possible to remove every soldier immediately upon his being wounded to a permanent hospital, well arranged, properly located beyond the field of military operations, and adequately appointed. This, however, cannot be done, and the consequent crippling of the beneficent offices of the army surgeon must be submitted to as one of the many evils incident to war.

The next paper is on the use of Calomel in Scarlatina, by Dr. E. K. Hunt, of Hartford. Dr. H. believes that by the judicious employment of calomel in scarlet fever the disease may be conducted not perhaps to a speedier, but with diminished violence to a favourable termination. He claims for the remedy no specific power over the disease in any of its forms or types. He has no hopes that it will arrest its deadly course in those cases where the malignant element is exhibited from the very onset, or remove the various dangerous sequelæ it leaves after it.

Dr. H. commences the treatment of scarlatina with an emetic of ipecac, or when the skin is hot and dry, of tartarized antimony, combined with a large dose of calomel—say from four to six grains for a child from four to six or eight years old. Subsequently he gives about half a grain, in conjunction with some appropriate refrigerant or anodyne remedy, every four hours. This he has found generally to maintain, throughout the entire course of the disease, free secretory action from all eliminating surfaces, and to keep the bowels in a sufficiently free condition. When the action is considerable, cooling and febrifuge remedies, such as the spirit of nitrous ether, the effervescing draught, sponging the surface freely with cold or tepid water, the free use of cold water internally, with such local remedies as may be indicated, are called for, and should be employed as circumstances require. In cases marked by oppression of the brain and nervous system, attended by moderate reaction, Dr. H. has found the cautious use of calomel, by its peculiar stimulant and revulsive properties, to assist materially in bringing about a wholesome reaction and thus aiding the powers of the system to cope successfully with the disease. But it is only for a few days that the continuous use of calomel is recommended or indeed allowable. After that, its occasional employment, and that generally only as an alterative, is all that is required. It avails nothing, Dr. H. remarks, towards *repairing* the damage often done to the organism by the disease—under these circumstances, indeed, a persistence in its use would but increase the mischief already done. In respect to the functional disturbances which sometimes follow the disease, weeks after it has run its course, and which probably have no other relationship to it than what the increased susceptibility to cold, irregularities of diet, etc., left by it may give rise to, the calomel, according to Dr. H., may be employed precisely as though the same indications had occurred under any other circumstances.

"It would be dealing unphilosophically," says Dr. H., "both with facts and all experience, to pretend that there were no cases of scarlatina in which calomel was inadmissible. Excessive irritability of the bowels sometimes; a peculiar irritation which, in some constitutions always accompanies the use of mercurials; positive nervous prostration owing to the shock incident to the onset of the disease, or to the oppression apparently due to the influence of the virus upon the brain and nervous system, and sometimes other causes, may for a time, and perhaps throughout the usually active stage of the disorder, contraindicate its employment. Such cases, however, happily, constitute but an insignificant

fraction of the whole number, and are always formidable under any plan of treatment."

The next paper is by Dr. Moses C. White, of New Haven, on the physiology of the crystalline lens, or the adjustment of the eye to distinct vision at different distances. Dr. W. points out the coincidence of his own views in respect to the uses of the fibrous structure of the crystalline lens, with those defended by P. A. Daguin, in his treatise on optics; and briefly refers to the opinions held by the leading physiologists of Europe on the mechanism by which the eye is capable of adjusting itself to correct vision at different distances, which opinions he considers as inconclusive or directly overturned by well-established facts. He refers to the several experiments of Duges, compared with the structure of the lens as developed by the researches of numerous investigators, and with certain facts connected with vision, taking in consideration, likewise, the direct experiments, in proof that changes do actually take place in the curvature of the crystalline lens, performed recently by Cramer in Holland, and Helmholtz in Germany, each experimenter working independently of the other. Dr. W. conceives the position to be established, that—

"The principal modification of the eye, to adapt it to distinct vision at different distances, consists in changes in the form of the crystalline lens, and it seems almost certain that these changes are produced by a vital contraction of the fibres of which the lens is composed, the fibres of the crystalline lens being endowed with the power of contracting, and changing the form of the lens in obedience to the will."

From the "sanitary report of Hartford County," presented by Dr. L. S. Wilcox, we learn, that during the years 1861, and more especially 1862, the county had been visited by an epidemic, which the physicians who witnessed it denominate "spotted fever." In respect to this epidemic, the report of Dr. W. is neither very full nor clear. Two cases are described.

These two cases are the only ones of which a record is known to have been made. Others, similar in feature and course, prevailed. The reports made to the society in 1862, bear testimony, that there was prevailing an epidemic influence of a marked character, affecting chiefly the mucous surfaces, and manifesting itself by diphtheritic exudations, or by vomiting and purging, and attended with alarming prostration. In some of the severer cases, the surface presents a dusky hue, or dark, or light red, or purple circumscribed spots; complaint being made of pain in the limbs, back, and head; the patient becomes early comatose, and, in fatal cases, death occurs early, and usually suddenly.

Dr. Moses C. White relates a case in which an iron nail, which penetrated and was broken off in the sole of the foot of a lady forty-five years of age, separated into twenty-six splinters, which, after causing great pain, suppuration at different parts of the foot, and severe constitutional disturbance, were removed at different times. During the three and a half months, during which the splinters of iron were in the foot, the patient had but little sleep. Twice she became wild and delirious from the intensity of the pain, and often the muscles of the foot and leg were affected with spasm. Her appetite was very poor, and she became extremely emaciated.

Biographical sketches are given of Dr. Luther Tichnor, of Salisbury, and of Dr. Jehiel Williams, of New Milford. From the latter we copy the following memorandum in reference to the disease known in New England as "typhoid pneumonia, or spotted fever," found among the papers of Dr. Williams after his death:—

"I was called, on the 23d of January, 1812, to visit the first two cases known as New Milford fever. The weather of the autumn of 1811 had been unusually mild, and during the month of December, for about six days, it was mild, and then, for about the same length of time, very cold. On the 24th of December there occurred one of the most severe snow storms experienced for many years —people in different parts of the town had their ears and noses frozen in taking care of their cattle and sheep. Fowls, sheep, and cattle perished in large numbers. The weather from December to May was changeable, and there were three ice floods in the Housatonic River quite near the village during the winter.

As the weather changed from mild to cold, the disease became more fatal, and in the month of March twenty-seven persons died in a circuit of two miles.

"There were cases of the disease in Roxbury and Washington, neighbouring towns in Litchfield County, and also in the towns of Amenia and Stamford, Dutchess County, N. Y. In 1813, there were a few cases in New Milford and the towns near, and the disease likewise prevailed in certain localities in New York, Massachusetts, and Vermont, not, however, in as malignant a form as in New Milford in 1812.

"The disease attacked persons between the ages of twenty-five and sixty. The most fatal cases were in those over thirty-five years of age. There were only three or four cases among children. The intemperate were very sure to die, while the temperate recovered from more severe attacks than destroyed the intemperate. The first two cases were seen on the 23d of January, 1812; two new cases occurred on the 24th—all four of which were dead by the evening of the 25th. Most of the cases seen in 1812 ran twenty-four, thirty-six, and forty-eight hours before the fatal event.

"The first symptom of the disease was a severe chill, similar to that of intermittent fever in severe cases; no reaction took place, the patient dying during the cold stage. In other cases reaction occurred, with fever, stinging heat, livid appearance of the cheeks, and bloated countenance. Some, in the cold stage, had pain in the head, with giddiness—a sense of weakness pervaded the entire body; there was much difficulty of breathing, as if a weight was upon the chest; there was some cough, with expectoration varying in appearance. In the more severe cases it was like dark soap—in a few cases there was a froth in mouth resembling cotton wool—such cases soon died. When the expectoration became copious and was streaked with fresh blood, the case usually recovered. When the tongue had a slimy appearance like dark putrid meat, the case soon proved fatal. The urine was scanty and high coloured. The pulse was frequent, the frequency augmenting with the progress of the disease; with the abatement of the symptoms, it became softer and less frequent. The discharges from the bowels were of a bilious character, and became more dark as the disease advanced. In some cases there was vomiting, or an attempt to vomit. After twenty-four or thirty-six hours from the attack the patient would become easy, appear to sleep, and in a moment the skin would become moist; but no improvement would result, unless the expectoration became streaked with fresh blood. The patients would desire cold water, which, when given to them, invariably increased their distress."

2. The Transactions of the *Boston Society for Medical Improvement* present a collection of notes and memoranda on subjects relating to medical and surgical pathology and therapeutics, all in the highest degree interesting, while they furnish valuable materials to assist the inquirer in the successful investigation of many questions of the highest practical importance.

We cannot attempt to present a continuous analysis of the numerous items embraced in the volume before us. They are, for the most part, so concisely stated, that to convey to our readers a correct idea of the facts they express we should have to transfer to our pages the greater portion of the extracts from the records of the Society as they appear in the publication before us. Our notice, therefore, must be confined to a few only of the extracts. We are not positive that in our selection we have always decided upon the most valuable portions, but happily, among items so generally interesting, we cannot go far wrong in our choice.

Four cases of tracheotomy in croup are given, in two of which the operation was followed by recovery.

The first case is reported by Dr. Cabot. The patient was a boy three years old. The disease had been of some three days' duration. The child had a loud, croupy, laboured respiration, a small, weak, rapid pulse, not intermittent; no decided lividity of face. A flapping râle could be heard both sides of back with tracheal sound, masking other sounds of respiration. Tracheotomy was decided on and performed. There was some venous hemorrhage, which ceased on admission of air into the lungs. The usual directions were given as to moist air, in-

jection of nitrate of silver, &c. The child expectorated a small amount of false membrane for several days; but at the end of a week from the operation he was so well that the tubes were removed. Entire recovery soon ensued.

The second case is reported by Dr. Minot. The patient was a girl nine and a half years old. The disease had been of about two weeks' duration; the symptoms were then, frequent hoarse cough, aphonia, with gradually increasing difficulty of breathing. No lymph could be seen in throat, but the laboured respiration was such as to prompt a resort to tracheotomy as the only means for saving the patient's life. The relief from the operation was immediate. No lymph was expelled—trachea intensely red. The tube was removed on the sixth day. On the morning of the ninth day, after a sudden occurrence of very cold weather, the symptoms of croup returned; the opening in the trachea nearly closed. The tube was replaced. The symptoms soon abated, and the tube was again withdrawn at the end of thirty-six hours. The child recovered entirely. No lymph was expectorated in this case, and none perhaps was formed; the disease was evidently acute laryngitis, with closure of the glottis from the swelling of the inflamed tissues. During the convalescence of this patient, an adult female of the family was attacked with acute tonsillitis, which terminated in resolution in a few days.

Dr. Gay stated that he had performed the operation on a girl three and a half years old, who had entirely recovered. Both before and after the operation she expelled a good deal of membrane. As in the case of Dr. Minot's patient, she caught a severe cold after a sudden cold spell, and was very hoarse for a day or two; but there was no obstruction to the breathing, nor was it necessary to replace the tube.

Dr. Minot was called to see a case in consultation. Three days before the patient—a boy seven years old—had been attacked with sore throat, cough, and hoarseness. When seen by Dr. M. there was aphonia, with laboured respiration. The tonsils were swollen, and had a few streaks of lymph on their surface. Tracheotomy was performed with immediate relief. Several fragments of membrane were expelled during the succeeding night and day, both by the mouth and through the tube. The breathing became again gradually obstructed, and the patient died on the fifth day after the operation—apparently from exhaustion. He had taken nourishment freely up to an hour before death. There was no autopsy, but it seemed probable, we are told, that the disease had extended to the bronchial tubes. During the last two days the tube was not introduced. the closure of the opening being prevented by the occasional introduction of the dilator and swab, by which the expulsion of the bronchial secretions was much facilitated.

The *dissection of a gravid uterus* was reported by Dr. Jackson. The uterus was from the corpse of an unmarried female, who declared herself to have been about six months pregnant. She had been consumptive for more than a year; the disease, contrary to the usual rule, is said to have rapidly increased from the date of her pregnancy. The uterus was entire and perfectly fresh. In length, in a straight line, it measured eleven and a half inches; in its largest circumference, twenty and a half inches. The placenta being felt through the parietes, at its posterior part, the organ was opened by a crucial incision anteriorly. The cord ran over the left shoulder and around the neck of the fœtus, which lay, with the occiput towards the left acetabulum. It was quite plump and healthy in appearance, weighing four and a half pounds. Through a blowpipe introduced into one of the uterine sinuses, these were inflated with moderate force, and the air soon appeared beneath the fœtal surface of the placenta. About one-third of the placenta was now peeled off, and a very careful examination made for any evidence of intervascular communication, but none was found; the usual appearance of the crescentic openings from the uterine sinuses was seen, but nothing more. A very nicely prepared coarse injection was next thrown into the sinuses, which, though it was extravasated to a considerable extent in the placenta, not the smallest vessel could be found passing into the mass from the uterus.

Dr. J. Wyman gave to the society an account of some observations made by him, on the different kind of bodies found in the dust deposited from or floating

in the atmosphere. The dust examined was obtained either from the floor of an unoccupied attic, or from plates of glass covered with glycerine and exposed to currents of air. The organic matter detected by aid of the microscope consisted of various minute fragments of vegetable tissues, such as woody tissue, spiral ducts, cuticle, simple, jointed, or stellated hairs, cells of tissues of leaves, pollen, &c. A few starch granules, resembling those of wheat, and giving the usual reaction with iodine, were occasionally found. In the dust from the attic of Harvard Hall, Cambridge, over one of the lecture-rooms, occupied by students for several hours each day, human cuticle and epithelium scales from the mouth were frequently detected. The lecture-room and attic communicate freely by means of a large ventilator. There were also found, less frequently, however, various spherical bodies; some of them spores of cryptogamous plants, and others resembling the eggs of some of the smaller invertebrate animals. All were provided with a well-defined cyst, which inclosed granules or cells, varying very much in size and appearance, in different specimens. Dr. Wyman was unable to identify the bodies in question, excepting that, in one instance, he detected the spores of a confervoid plant. As these were found before the conferva were beginning to be developed, it is probable they came from plants of the preceding year, and had been carried about by the winds after the drying up of the stagnant pools, in the latter part of the summer and autumn. Some of the egg-like bodies appeared to contain an early embryo, but which could not be referred to any particular species. One of the spores detected was especially interesting from its resemblance to pus and mucous corpuscules; so close was the resemblance, that one might be readily mistaken for the other. The fact is of importance, when considered in connection with the recent attempts made in Germany, to establish the presence of pus in the atmosphere, and in this manner to explain the transmission of certain forms of disease. The existence in the atmosphere of a large number of the spores of cryptogama gives a probable explanation of the transmission of certain of the algæ and fungi, which infest the bodies of man and animals.

The subject of the existence of organic forms in the atmosphere has been largely investigated by Pouchet, Quatrefages, and Pasteur.

A very unique case of spina bifida was reported by Dr. E. Huntington, of Lowell. The child was born on the fourth of January, at full period. It was well developed, and without other deformity than the spina bifida, and a slight varus of one foot. The spinal deformity was in the form of a tumour, hanging from the lower part of the vertebral column, on a line with the crest of the ilia, by a long peduncle, about a foot in length and about as thick as the little finger, but enlarging somewhat just before its junction with the tumour. The latter was nearly the size of two fists, rounded in form, but tapering towards the peduncle; fleshy in feel, not tense, but with sense of fluctuation. The surface had a smooth, shining appearance, without cutis. The cutis was well developed upon the peduncle, but terminated abruptly where the body of the tumour began. Upon the birth of the child, a ligature was applied to the peduncle, as near as possible to its origin, and it was then divided. The ligature slipping, gave rise to an almost fatal hemorrhage. The child did well, however, and so continued to do up to May 20th. The remaining portion of the peduncle presented a central cavity; into this a catheter was passed, through which a few teaspoonfuls of clear serum escaped; on being heated the serum became solidified. To prevent any further escape, a ligature was applied. There appeared, at first, to be a considerable deficiency of bone where the peduncle originated, and for two months the cicatrized surface bulged out quite perceptibly when the child cried. The opening, however, gradually contracted, leaving, at the date of the report, only an irregularity of surface, to be felt upon pressing down upon the vertebræ; the remains of the peduncle being then about one-quarter of an inch in length.

The cavity of the tumour contained a little dirty fluid; it was lined with a serous membrane; its parietes varied in thickness from $\frac{1}{4}$ to $\frac{1}{2}$ an inch. Upon the cut surface many cysts were exposed; the intervening tissue being lax but tough. The peduncle had shrunk to $2\frac{1}{2}$ inches in length. Slit open throughout, no trace of a lining membrane appeared, but rather common integument. The cavity through its centre was about one-fifth to one-fourth of an inch in dia-

meter; it was with considerable difficulty a small probe was passed through it into the tumour. With the cavity of the latter the canal of the peduncle communicated, at about where the tumour began to taper; not directly, but just within the orifice of another adjoining canal, about three-fourths of an inch in length, and large enough to admit a probe about two lines in diameter. Upon the inner surface of the peduncle, and closely connected with it by a lax cellular tissue, were two or three quite large nerves and a large bloodvessel, which were gradually lost within the tapering portion of the tumour.

The Existence of a Posterior Fontanelle exceptional.—Dr. Jackson believed, that by most anatomists and writers on midwifery, a deficiency in the skull of the young infant, at the junction of the occipital and two parietal bones, constituting the posterior fontanelle, is described, and in an obstetrical point of view it is evidently considered as a matter of some practical importance. Humphrey on the Skeleton says, speaking of the two fontanelles, "The hinder of the two is the smaller, and is closed a few months after birth." Dr. J. said, that many years ago his attention had been directed to this subject, and though he could not speak from figures, nor even from notes, he had examined many crania, and the following were his general conclusions: that the posterior fontanelle is generally closed in the mature fœtus, and occasionally some weeks earlier; that, where it exists, it is generally an insignificant affair, and should not be described in connection with the anterior fontanelle, still less in comparison with it; and that, though it varies in size, when it does exist, it can never be called a large opening. The mistake has probably arisen from the fact, that the existence of the fontanelle has been based upon an examination of the heads and not the crania of new-born infants. The upper extremity of the occiput being stiff and unyielding, and the adjoining portions of the parietal bones so far the reverse, that there is an appearance of an actual deficiency of bone; or, again, upon an examination of the crania of infants that have been stuffed out when drying, so as to cause an actual separation of the bones.

Ergot during Labour.—A very interesting discussion took place, at two consecutive meetings of the society, on the use of ergot as an accelerator of labour. When properly given, in the right cases, and at the proper stage of labour, we know of no agent from the use of which more beneficial results may be anticipated; but when resorted to in improper cases and stages of labour, merely to save time, by shortening the attendance of the accoucheur, we know of none more mischievous in its effects; destroying, most generally, the life of the child, and jeoparding, to a fearful extent, that of the mother. We would remark, as the question came up in the discussion, that we have met much more frequently with retention of the placenta, from what is called hour-glass contraction of the uterus, in labours where ergot has been given, even where all things have appeared most favourable for its use, than in those labours in which it has not been resorted to.

D. F. C.

ART. XVII.—*Reports of American Hospitals for the Insane.*

1. *Of the McLean Asylum, for the year* 1862.
2. *Of the Butler Hospital, for the year* 1862.
3. *Of the Retreat at Hartford, for the fiscal year* 1862–63.
4. *Of the New York City Lunatic Asylum, for the year* 1862.
5. *Of the King's County (N. Y.) Lunatic Asylum, for the fiscal year* 1861–62.
6. *Of the Friends' Asylum, for the fiscal year* 1862–63.

1. IN the report for 1862 of the *McLean Asylum*, Dr. Tyler thus writes in regard to a recent improvement of that hospital:—

"The completion of the edifice for the accommodation of the most demonstrative forms of mental disorder, makes an era in the history not only of this Institution, but also of asylum construction and architecture. The means afforded for its erection were ample; the time and careful attention given to all the details of its arrangements were without stint, and the result in the present ad-

mirable structure is more than satisfactory. Spacious and cheerful apartments, commodiously furnished, free admission of sunlight, thorough ventilation and comfortable temperature, architectural beauty within, and pleasant surroundings without, access at will to the grounds, all are attained in consistency with the entire safety of the occupants."

An inclosure of nearly five acres, laid out and planted in the style of English ornamental gardening, has been opened to the use of the patients in the female department. With its trees and shrubbery, its walks and drive-ways, it cannot fail to be of great utility to its invalid frequenters.

	Men.	Women.	Total.
Patients in the asylum, January 1, 1862 . .	87	101	188
Admitted in course of the year . . .	40	42	82
Whole number	127	143	270
Discharged, including deaths	49	45	94
Remaining, December 31, 1862 . . .	78	98	176
Of the discharged, there were cured . .	18	21	39
Died	11	7	18

"This Institution, in common with many kindred ones, has registered fewer admissions in the last year than has been usual. Terrible and many as are the evils resulting from the war, the increase of insanity does not yet seem to be one of them, and it is not difficult to understand how it may have acted in its prevention."

But, farther on, he says: "The war has produced some mental disease. The intense loneliness of a deserted home, the apprehension of harm to the beloved ones away, the shock of the fatal event when at last it comes, have, in some instances, unsettled the reason; and a few, too, have come from the camp and the field with a brain damaged by overwork, excitement, and exposure."

The moral treatment at this, one of the oldest and best appointed hospitals in the country, is thus compendiously noticed.

"The ample facilities possessed by this Institution for interesting and diverting those whose lot, for a time, falls here, have been in constant requisition during the year. Riding, driving, all sorts of games and athletic exercises in-doors and out, lectures, concerts, celebrations of the different holidays, work for the soldiers and for charitable purposes, and a well assorted library, all have contributed to the great end of occupying, comforting, and improving the household. Each year adds much to the available means for good, and the Asylum to-day possesses greater resources than ever before, for the accomplishment of the noble purposes of its establishment, in the results accumulated by the labours and experience of nearly half a century."

A considerable part of the report is devoted to an exposition of the various methods in which incipient insanity advances so insidiously as not to be suspected by its victim or his surrounding friends.

The report closes with the following just tribute to the memory of the late Dr. Luther V. Bell, who died at his post as Brigade Surgeon of the Army of the Potomac:—

"For nearly twenty years Dr. Bell held the position of Superintendent of the Asylum, identifying himself with all its interests, and directing its daily management with a comprehensive skill, sagacity, and forecast, a purity and elevation of purpose, and a scrupulous faithfulness to every relation involved, which secured for him, for those intrusted to his care, and for the Institution, the happiest and the most abundant results. The accuracy and variety of his knowledge, the soundness of his judgment, and his remarkable faculty of adapting means to ends, meet one here at every step, while the recognized method of treatment, the traditionary usages and rules of the house, bear the indelible stamp of his thorough and exact comprehension of the needs of the insane, and his wonderful tact in providing for them. His active and commanding intellect, his extraordinary attainments as a scholar, philosopher, and psychologist, his extensive knowledge of everything pertaining to the phenomena, management, and history of insanity, his able and long-continued efforts and success in diffusing and establishing correct views of the nature and treatment of the disease,

have justly caused him to be regarded as one of the most distinguished of the many great men who have ever adorned the medical profession. His inbred sense of honour, his entire removal from all meanness and duplicity, his sterling integrity and inflexible moral courage, his keen sense and ardent love of right, leading him to its defence in utter disregard of any personal consideration, and in the face of any obstacle, and qualifying and inspiring all his every-day life, and yet with no touch of pharisaical exactness or pretension, commanded the admiration and respect of all who knew him, and gave him an uncommon power of personal influence, while it made him of inestimable worth as a friend. His courteous and dignified bearing, his gentle manner and quiet humour, his inexhaustible store of anecdote and useful information, gave him a wonderful charm as a champion. Strong, though not demonstrative, in his feelings, warm in his attachments: he loved his home, his friends, and his daily association, and devoted himself to their welfare. He loved his country, and felt the severity of her fiery trial, and, faithful as always to his convictions of right and personal obligation, he gave her as his last offering the rich accumulation of his experience and—his life: a brilliant example of lofty Christian patriotism."

2. It will, perhaps, be recollected that, in his report for 1861, Dr. Ray, of the *Butler Hospital for the Insane*, portrayed the evils consequent upon the reading to an insane patient a notice of an application, and the proceedings thereon, for the apointment of a guardian over the said insane person. This exposition produced the desired effect in Rhode Island, for at the next following session of the Legislature of that State the following law was enacted:—

"In any application before a Court of Probate for the appointment of a guardian to the person and estate of a lunatic who may be confined in the Butler Hospital, the Court may proceed thereon without giving personal notice to the respondent, or without his appearance, whenever the superintendent, or the person having charge of the Butler Hospital, shall certify upon the citation that said respondent is a lunatic and confined in said Hospital, and that the personal service thereof will be detrimental to his mental condition."

It would be well for the interests of the insane were similar laws passed in the other States.

	Men.	Women.	Total.
Patients in Butler Hospital, Dec. 31, 1861 .	69	66	135
Admitted in course of the year . . .	16	20	36
Whole number	85	86	171
Discharged, including deaths	20	19	39
Remaining, Dec. 31, 1862	65	67	132
Of the discharged, there were cured . .			17
Died			5

After the presentation of a brief synopsis of the medical record for the year, Dr. Ray, as is his wont, enters into a discussion of some special subject connected with the treatment of the insane. That which occupies the larger portion of this report is the question of modern reforms.

His course of argument is as follows:—

"The reformer's creed frequently contains but a single article of belief, namely, this, because a thing is bad, therefore the directly opposite thing is necessarily good. The effect of this fallacy has been strikingly manifested, for instance, in the controversy, not yet settled, respecting mechanical restraint as applied to the insane. Everybody admits that it has been grossly abused, but an immense difference prevails as to the practical inference that should be drawn from the fact. While it leads one party to use it for proper purposes and in a judicious manner, so as to secure its benefits and avoid its evils, it leads another to disuse it altogether as an unmitigated wrong."

Plenty of reasons are given, by each party, for its course; there is "a touch of the romantic" in the thought of governing the insane merely by "moral suasion or the gentle laying on of hands;" and the plan was received with great *éclat* in England.

"One thing leads to another, and the idea of complete non-restraint was

followed, in the fulness of time, by that of banishing all those distinctive architectural arrangements supposed to be indispensable to the proper care and custody of the insane. Open fires on the hearth, windows without guards, and doors without locks, have been adopted in one or two hospitals lately erected in England. But the careful observer, who studies insanity like any other object of scientific investigation, will hardly be satisfied with the reasons offered for such a radical reform; and though willing to accept results as the proper tests of their soundness, he will require that the experiment shall be tried on a large scale, by various parties, and its indirect and contingent as well as immediate results be fairly taken into the account."

Because evils possible to the insane have not arisen under this system, we have no right to infer that they will not arise. Hence every evil must be provided for. "The man who congratulates himself on the success of his measures for preventing suicide, on account of entire exemption for several years, will find his self-complacency somewhat ruffled when, without any change of practice, several cases occur in rapid succession."

Again, in the reforms in this specialty, individual traits are mistaken for general conditions, and thus conclusions are jumped at. The reasoning is like this: "A patient long subjected to mechanical restraint improves under its disuse, therefore no patient requires it, and complete non-restraint must be the unexceptional rule. Another is annoyed by the sight of locks and guards, and which, in fact, are unnecessary for him, therefore they are annoying to all and unnecessary for any. Another desires to go out unattended, and undoubtedly is all the better for the privilege, therefore unrestricted freedom in this particular should be the general rule. Deductions like these may seem somewhat puerile, but they are scarcely exaggerations of what have actually been made."

While these proposed reforms show an admirable spirit, they appear to exhibit "confusion of thought both as to the ends which are proposed and the conditions of a successful experiment."

As regards these conditions, it should be remembered that morbid movements of the nervous system are often slow, and hence no general scheme of management should be adopted from any one phase of that movement. We know not what may be developed. And as in individuals, so in hospitals. Months may pass without the necessity of any mechanical restraint, to "be followed by as long a period of its abundant use." Hence, if any plan or provision of management have discoverable defects, the assertion that "no harm has arisen from it, so far," is unsatisfactory proof of its excellence. To inspire confidence, it must be independent of "the chances of fortune and the shortcomings of men."

In regard to the proposed ends, it may be assumed that "the philosophical test of social and political reform—the greatest happiness of the greatest number—must not be exclusively adopted here. A provision is not to be hastily discarded merely because it has been attended by abuses, or because its evils, on the whole, seem to overbalance its benefits. The careful inquirer will first ascertain whether, by some administrative change, the former may not be prevented, and the latter retained. To give up a provision which is known to serve an excellent purpose, because in the hands of the careless and heartless it has been made an instrument of wrong, may be wise under some circumstances, but can hardly be considered a triumph of professional skill. True science, true skill, consists in meeting the exigencies of each particular case, and though these must sometimes be subordinate to the general good, this necessity must be regarded as a defect rather than a merit. *The question we have to deal with is, how we can best reach the needs of each one of those individuals who make up the collective body under our charge; and so long as we keep this end before us, we may be sure we are on the right course.*"

The reasons given in favour of some reforms appear to spring from false notions of insanity, and especially of the thoughts and feelings of the insane. All architectural safeguards, it is said, should be avoided because they constantly remind the patient of his infirmity. But many patients welcome these means of restraint because of an "habitual sense of insecurity." Others recognize the necessity of them because they are conscious of their own unfitness to be at large. "Much of the repugnance which the insane are supposed to feel to the

restrictive arrangements of a hospital, may be fairly attributed rather to that captious, fault-finding spirit, so common in the disease, than to any keen sensibilities in the matter."

But, it is said, if restraint *is* required, let it be "the look and the touch of an attendant, not barbarous implements of wood and iron." But how far is confidence to be placed in attendants, how well soever qualified both by nature and by experience?

"For a short period and an imminent emergency, we may be warranted in relying upon them implicitly. But lengthen the period, or render the contingency more remote and uncertain, and to that extent personal vigilance becomes unreliable. An attendant placed in charge of a patient incessantly bent on self-destruction, may be safely relied on for several hours; but let it be his sole business to prevent a patient from striking when the impulse comes, which may be but once in two or three months, and who that knows anything of the subject supposes that the blow will not be struck at last? The continuity of attention required for this purpose may not be impossible, but in practice it would be idle to expect it. In fact, there is really no relation between the end and the means. The question is not which of the two kinds of restraint, personal or mechanical, is preferable in this case, but whether the latter is not the only one capable, in the nature of things, of effecting the purpose. Considering the matter in reference to its immediate effects on the patient, and unconnected with theories or biases, it seems difficult to conceive how there could be two opinions about it. And in the class of cases where either would be admissible, I have been led by twenty years' experience to believe that a simple contrivance of leather or cloth placed on the limbs, performing its service quietly and steadily, is infinitely preferable to an array of attendants holding the hands and feet, and at every relaxation of their efforts, provoking renewed struggles from the patient."

The practice of disregarding, or attempting, by devices of management, to keep in abeyance some prominent traits of insanity, appears to have been carried too far. There has been a disposition to throw the insane too much upon their powers of self-control. Say what we will, the world has not "always been mistaken in the idea that a disposition to mischief is necessarily a frequent element of insanity." Even if this were eradicated, there is another which *must* limit our confidence in the insane. "*The guiding, determining power of the patient—the balance wheel, if I may use the figure, which regulates the mental movement—is generally more or less impaired, and some foreign power must, to that extent, take its place.* For this reason he is taken from home or his customary surroundings, where he is following the bent of his disordered fancies, and placed where his liberty of action is greatly curtailed, and his movements directed by others. To some, scarcely anything more is necessary than the unavoidable restrictions of the hospital. In others, the gravity of the disturbing element may call for the utmost amount of restriction at our disposal. *In some shape or other, restriction is an essential element in all hospital management of insanity;* but it would be preposterous to contend that just so much or so little is the exact measure best suited to all cases alike."

Towards the close of the discussion, a few pages are devoted to the subject of general commissions for the supervision of hospitals.

3. The most important numerical results at the *Hartford Retreat for the Insane*, as embodied in the report of that hospital for the official year ending with the 31st of March, 1863, are as follows:—

	Men.	Women.	Total.
Patients at the beginning of the year	105	116	221
Admitted in course of the year	79	91	170
Whole number	184	207	391
Discharged, including deaths	72	88	160
Remaining at the end of the year	112	119	231
Of those discharged, there were cured	32	40	72
Died	14	14	28
Whole number admitted since its opening	1912	2168	4080

	Men.	Women.	Total.
Discharged	1800	2049	3849
Cured			1931
Died			421
Single, admitted since March 31, 1848	728	730	1458
Married " " "	574	704	1278
Widowed " " "	60	207	267
Between 20 and 30 years of age at first attack	360	544	904
Between 30 and 40 " " "	243	302	545

Causes of death the past year.—General debility, 2; exhaustion from acute mania, 4; diarrhœa, 3; phthisis, 4; erysipelas, 2; paralysis, 2; epilepsy, 2; "simple exhaustion," 3; "disease of the brain," 2; chronic diarrhœa, general paralysis, suicide, and disease of the liver, 1 each. "The year," remarks Dr. Butler, "has been one of general prosperity and quiet progress."

Aside from the statistics and the acknowledgment of donations, the report consists almost wholly in an abstract, with quotations, of an article on insanity, published in Mr. G. W. Childs' *National Almanac*, for the year 1863.

4. "Each year," remarks Dr. Ranney, in his report for 1862, of the *New York City Lunatic Asylum*, "confirms me in the opinion that the course of moral treatment which now obtains in hospitals for the insane is doing much to lessen the severity of the most repulsive and formidable phases of insanity. The avoidance of restraint has diminished the necessity for its adoption. The removal of everything which would irritate the patient tends to make the disposition milder and more affable, and this change of disposition is an important advance toward a perfect mental restoration. A comparison of the old system with the new, as to results, will prove the wisdom of the modern method of treatment. Sixteen years ago this asylum had only 383 inmates, of whom at least 30 were confined with leathern straps and iron wristlets, and 40 more were constantly kept in their rooms; but recently, although the number has increased to 800, there has not been an average of two patients confined to their rooms, and only at long intervals has a restraining-strap been used. This, when resorted to, was only to confine the hands of patients who had very strong suicidal tendencies.

"The iron wristlets and leg-locks, as a means of restraint, have not been in use since the year 1848. To this change is to be attributed, in a great degree, the more orderly condition of the house."[1]

	Men.	Women.	Total.
Patients in hospital January 1st, 1862,	304	501	805
Admitted in course of the year	133	209	342
Whole number	437	710	1147
Discharged, including deaths	155	223	378
Remaining, December 31st, 1862	282	487	769
Of those discharged, there were cured			165
Died	51	46	97

Causes of death.—"Phthisis pulmonalis, 25; paralysie générale, 20; congestis cerebri, 13; epilepsia, 6; senectus, 5; chronic diarrhœa, 5; paralysis, 5; typhomania, 3; exhaustive mania, 3; anæmia, 3; apoplexia, 2; chorea, 1; typhoid fever 1; anasarca, 1; ascites 1; dysenteria, 1; pneumonia, 1; albuminuria, 1."

Although there were seventeen attempts at suicide, no one of them resulted in fatality. The following tabulated exposition of the suicidal propensity for the year will be found interesting:—

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[1] It will doubtless be remembered that this hospital was the last American stronghold of the old system of mechanical restraints, and that they were there continued for years after they had become, in some other hospitals, as nearly abolished as they are at the present day.

Attempted Suicide.	Men.	Women.	Total.
Before admission	7	16	23
After admission	5	5	10
Before and after do.		1	1
Total	12	22	34
Attempted once	7	14	21
Twice	3	3	6
Thrice	2	1	3
More than three times		4	4

Nativity of Patients.	Men.	Women.	Total.
Ireland	4	12	16
Germany	2	5	7
England	1		1
Prussia	1		1
Belgium	1		1
Canada		2	2
Austria		1	1
New York	3	2	5

Nature of Attempt.	Before Admission. Men.	Women.	Total.	In Hospital. Men.	Women.	Total.
Jumping from windows and heights		2	2			
Hanging	2	2	4		3	3
Starvation,		2	2	2	1	3
Drowning	2	3	5	3	3	6
Cutting throat	1	1	2			
Cutting arm	1	2	3		1	1
Drinking Laudanum	1	2	3			
Taking morphine		1	1			
Strangulation					4	4
Not specified	1	7	8			
Total of attempts	8	22	30	5	12	17

We make the following extract, believing that Dr. Ranney therein alludes to one of the true causes of the diminished number of admissions to the hospitals since the beginning of the war. It is undoubtedly true that many insane men have gone into the army. This is, in our opinion, wrong, but we know not that, under the circumstances, it could have been prevented:—

"The war excitement does not seem to increase the number of admissions; on the contrary, there is a very important reason why it should at first diminish the number. Many of the ordinary inmates of an asylum are only partially insane, and although it would be exceedingly difficult for them to obtain constant employment in the city, this class of persons can readily find positions in the army. Conversing sensibly on most subjects, as soldiers their mental defects are not quickly discovered, while, in the city, their immediate intercourse with their employers soon discloses their true condition. Nor has the war given any peculiar character to the delusions of those admitted. This results principally from the seat of war being so far distant, and the number so small that have returned home. Several patients admitted the past year were discharged soldiers; but from a careful examination, the opinion was formed that all were insane previous to enlistment."

5. The records of *King's County* (*N. Y.*) *Lunatic Asylum* for the fiscal year ending with the 31st of July, 1862, furnish the following general results:—

	Men.	Women.	Total.
Patients at the beginning of the year	137	193	330
Admitted in course of the year	91	113	204
Whole number	228	306	534
Discharged, including deaths	84	84	168
Remaining, July 31, 1862	144	222	366
Of those discharged, there were cured	44	43	87
Died	14	18	32

Died of phthisis, 8; general paralysis, 6; exhaustion, 5; ulceration of intestines, 2; epilepsy, 2; apoplexy, paralysis, meningitis, congestion of the brain, inflammation of the brain, diarrhœa, dysentery, peritonitis, and congestion of the liver, 1 each.

No attempt is made in the report to explain the great predominance of females among the patients.

"The number of admissions during the year," says Dr. Chapin, "has been somewhat augmented in consequence of the war. Seven soldiers have been under treatment, of whom four were discharged recovered, one died, and two remain, one of whom is probably incurable. The latter was formerly a police officer in Brooklyn, and became insane while on duty at Newport News, from the effects, it is supposed, of sunstroke. But of those whose insanity is attributable, directly or indirectly, to our national difficulties, the largest proportion were females. Some incident of unusual interest is associated with nearly every one of these cases. A mother became insane in consequence of having two sons impressed into the Southern army; she has also a son in the Northern army; and a young lady lost her reason in consequence, not so much of the enlistment of her brother, which took place early in the war, as on account of the peculiarly hazardous nature of the duty to which he was assigned."

It is gratifying to perceive that this hospital is beginning to receive pretty liberal donations of reading matter. The great mercantile maelstrom of New York has heretofore whirled so nearly everything in its vicinity into its special current that the needs of suffering humanity have been too often overlooked.

6. In taking up the "Forty-sixth Annual Report of the State of the *Asylum for the Relief of Persons Deprived of the Use of their Reason*," we are reminded, perhaps for the hundredth time, of the awkwardness as well as the interminability of the title of that comparatively small, but very excellent hospital, which, though in the immediate vicinity of the great city of Philadelphia, nestles in rural quietude among its native groves and its cultivated willows. That title is so long, so periphrastic, that it is seldom, if ever, used, except in official documents. The hospital, if we are not mistaken, is always spoken of as the "Friends' Asylum," or the "Frankford Asylum." Will not our friend, Dr. Worthington, turn his attention to this matter, and effect a "reform?" For reasons heretofore given, the word "asylum" is objectionable. Then why not alter the said title to "The Friends' Hospital for the Insane?" Or, better still, why not follow the example pursued at Providence? Josiah Butler gave forty thousand dollars to the hospital in that city, and the title of the establishment became "Butler Hospital for the Insane." Will not some one in the city of brotherly love by his liberality justify this institution in making a similar change in its title?

	Men.	Women.	Total.
Patients in Friends' Hospital, March 1st, 1862			62
Admitted in course of the fiscal year . .			13
Whole number	32	43	75
Discharged, including deaths	7	12	19
Remaining, March 1st, 1863	25	31	56
Of those discharged, there were cured . .	2	6	8
Died	2		2

Died of gastritis, 1; of erysipelas supervening paralysis, 1.

"In its early and acute stages, insanity, owing to the high grade of accompanying cerebral irritation, is not unfrequently attended with considerable danger to life, and such cases during the past, as in previous years, have furnished us with the greater portion of sickness requiring active medical treatment. When patients have escaped the dangers of the acute form of the disease without the recovery of their reason, and remain insane for the rest of their lives, they often, when properly cared for, continue to enjoy many years of uninterrupted physical health; and among this class of our patients during the past year, the standard of general health has been very satisfactory. In many cases, however, the depression of the vital powers consequent on the diseased condition of the brain, to which the mental disorder is due, continues for life and renders the insane less able to resist the causes as well as attacks of disease to which they may be exposed, and their lives are thus materially shortened. In other cases, especially of those whose constitutions have been impaired by intemperance or other

excesses, or whose minds have given way under a long continued pressure of care and anxiety, the original disease of the brain rapidly increases, and speedily ends in fatal disorganization."

We make some selections from that part of the report which relates to the management of the patient. It is pleasant to perceive that at this, the first hospital for the insane, whether in America or Europe, at which a course of scientific and literary lectures was delivered before the patients, this important branch of moral treatment has not fallen into disuse.

"The Library and Museum have continued to be resorted to by both male and female patients at different hours of the day. The lecture room, with its very complete apparatus, has been in very frequent use during the winter, and the exhibitions of dissolving views with the magic lantern, on two evenings of the week, have been attended by most of the patients, and have afforded them a high degree of satisfaction."

"An important element of success in the application of the various measures designed for the welfare of the insane, is their separation into small groups or companies, so that patients with the same form of disease, and consequently requiring the same remedies, may as far as practicable be subjected to the same details of treatment. In order that hospital classification may be perfect, it is not necessary that the subdivision of patients shall be very minute, or that it shall comprise any fixed number of classes. A more important point is, that each class shall be so small that the attendants in charge shall not be overburdened with their duties, so as thus to be prevented from giving to the patients the needful attention that each case requires. It is easy to understand that in a large institution, with several hundred patients, though there may be numerous wards and classes, the number of patients in a ward, and their proportion to the attendants employed, may be much greater and the classification consequently more defective than in a smaller institution, where, owing to the reduced number of wards, the classification might appear to be less complete.

"In our Asylum the wards are designed for ten patients each, and the proportion of attendants to patients being as one to four, which is perhaps larger than in any similar institution in this country, enables them to give that minute personal attention to each case that is so necessary to the best welfare of the insane."

We believe that the relative proportion of attendants to patients has always been larger at this hospital than at any other in the country. P. E.

ART. XVIII.—*Hospital Notes and Memoranda; in Illustration of the Congestive Fever, so-called, or Epidemic Cerebro-Spinal Meningitis, as it occurred in the Winter and Spring of* 1862–63, *in the Camps in and around the Town of Newbern, N. C.; with some account of its Origin, Nature, and Treatment.* By J. BAXTER UPHAM, M. D., Surgeon in Charge of Stanly General Hospital, 18th Army Corps, Department of North Carolina. (Reprinted from the Boston Medical and Surgical Journal.) 8vo. pp. 38. Boston, 1863.

THE disease to which the notes and memoranda of Dr. Upham refer, is, in every point of view, an interesting one. In many parts of the United States it has prevailed of late years as an extensive epidemic, and in the great majority of cases its fatal course has not been stayed by any plan of treatment that has been put in practice. Every contribution, therefore, which is adapted to improve our knowledge of its pathology and treatment cannot but be in the highest degree acceptable.

The records of cases, some twenty in number, presented by Dr. U., are mainly from the note books of his associates on the medical and surgical staff of the General Hospital at Newbern, N. C.; while the autopsies were made, under his inspection, by the attending surgeons in whose wards the deaths occurred. These cases, in every instance, originated in the camps and barracks adjoining the

town, from whence they were brought into the hospital at an earlier or later period after the attack.

The town of Newbern is situated upon the river Neuse, at its junction with the Trent, some forty miles from its entrance into Pamlico Sound. Both rivers are navigable for a few miles above their junction. There are no tides at this point, but the depth of water is affected by the force and direction of the wind. The town is built upon a flat, sandy soil, raised only a few feet above the water. The surrounding country is level, alternating with sandy plains and swamps, for a mile or two from the outskirts of the town, and then begins the great, almost impenetrable, pine forest, with its marshes and tangled undergrowth. The climate is, for the most part, mild and salubrious in winter and spring, but hot, humid, and subject to malarial influences in summer and autumn.

The troops were encamped mainly just beyond the town, in the driest practicable spots, and sheltered partly in tents or barracks. The barracks were built of green stuff (dry timber not being within reach); the logs, mostly of hard pine, being taken immediately from the forest, or from out the water where they had been lying for some weeks. The barracks were necessarily cold and damp and redolent of pitch and paludal moisture, while, from their size in proportion to their inmates, and their internal arrangement, generally, the supply of fresh air within the wards was entirely inadequate, and the general diffusion of light and heat throughout them impracticable.

The regiments most affected by the epidemic were the 44th, 45th, and 51st Massachusetts and the 10th Connecticut. The three first had been stationed at Newbern less than two months when the disease appeared, while the last named had remained in or near the same locality for nearly a year. These regiments were quartered in barracks. Isolated cases also occurred in the other regiments occupying tents. The 24th Massachusetts, an old regiment quartered in barracks near the 44th, it is believed, escaped the disease; in company with the 10th Connecticut, the 24th Massachusetts left the department before the cases of the disease became multiplied. These occupied, before leaving, a sandy, sterile plain on the right bank of the Neuse, some half a mile beyond the town, and elevated perhaps five or six feet above the level of the river. The 44th, which suffered most, was nearest the bank: in its immediate vicinity were a couple of small marshy bogs, through which flowed a stream of water. The water mainly used for drinking and culinary purposes was brackish and unpalatable; it was obtained from wells in the vicinity of the camp. Beyond and above the encampment, to the edge of the woods, as well as opposite, towards the river Trent, a broad, sandy plain stretched out for a mile or so. The woods in this direction had been extensively felled since the occupation of the town, as a precautionary measure. The 45th and 51st Massachusetts regiments were also encamped on the right bank of the Trent, two miles above the town, on a flat, alluvial, sandy soil, about 12 or 15 feet above the level of the river, and dotted with numerous small pools of stagnant water, even within the limits of the camp. The distance from the river at this point to the swampy woods beyond, is perhaps three-fourths of a mile. Over this extended and barren plain the winds have free sweep, bringing, in a dry time, a simoom of sands upon the camps. The water used by the last named regiments was mostly obtained from a barrel sunk in the ground at the river's edge.

The attack of the epidemic was usually sudden; the patients, most commonly, continuing on duty, without complaint, up to the very period of their seizure. Its subjects were, in most instances, the robust and apparently most healthy individuals, between the ages of 18 and 24 years.

The attack was ushered in with a sense of chilliness; headache, oftentimes experienced chiefly at the occiput; dizziness, pain in the back and limbs, occasionally very severe, attended sometimes with rigors, and with nausea and vomiting. A sense of stiffness in the muscles of the face and neck was often an early symptom. Some attacks commenced like a common cold, with a tendency to paralysis of the tongue, and some of the muscles of the face, while the respiration would be difficult and irregular, giving cause to fear congestion of the lungs. Early in the attack, tenderness at the nape of the neck and along the spine was often present. The skin was usually moist, but hot; the face suffused, often of

a dusky hue, with distortion of features, congested and suffused eyes. For the most part, there was not active delirium, but rather perversion of the intellect, with dulness and indifference to outward objects. From this condition the patient could be roused, and then would answer questions correctly. The tongue had, at first, a white, creamlike coating, which subsequently became yellowish or brown at the centre and base, and, more rarely, towards the close of the attack, dry and fissured. There was loss of appetite, but not usually very urgent thirst. The action of the heart was irregular, sometimes tumultuous; to it the pulse did not always respond. In most cases, the latter was accelerated—not strong—occasionally intermittent. The bowels were regular, or alternately loose and confined. Petechiæ, very similar to the true typhus eruption, were often present upon all parts of the body excepting the face; they were persistent under pressure, and varied in hue from a very dark raspberry to the blackness of true petechiæ. Purpureal spots, of large size and abundant, were sometimes present, and were always a grave symptom. There was no marked tenderness of the epigastrium or abdomen. The more protracted cases were attended, towards their close, with sordes of the teeth and lips, and involuntary evacuation of urine and feces. Decubitis was mainly on the side, with the head often retracted, and the neck rigid and stiff—partial opisthotonos. There was invariably great restlessness and jactitation. As an accompaniment, and occasionally sequel to the disease, iritis and synovitis were observed in several cases—in one pericarditis. The patients often died without much indication of exhaustion.

The foregoing constituted the more prominent and constant symptoms of the disease—they were never all observed nor even the majority of them to be present in the same case. Some singular and anomalous symptoms were occasionally met with, as a pleasing delirium, with loquacity, priapism and decidedly erotic desires. In a few very severe cases no moan or sound of any kind escaped the patient, but the restlessness was fearful, and ceased only at death. In other cases there was much moaning. Stiffness of the muscles of the neck and back, or some perverted action of the muscles of the face, amounting at times to spasm, was almost pathognomonic.

The duration of the disease varied from less than thirty-six hours, to three, four, or six weeks, and even longer. According to Dr. Upham's observation, its most usual duration was from three or four to seven days.

In regard to the prognosis, this was in general unfavourable. Of about 40 cases received into the Stanly General Hospital, 28 proved fatal. Of the 5 cases referred to by Dr. Kneeland, all died, as did also the 14 communicated by Dr. Jewett. Dr. Cowgill reports 5 cases of recovery out of 12, being the largest ratio of recoveries in proportion to the number of cases treated.

The anatomical lesions were chiefly confined to the brain and spinal cord. When death occurred within two or three days, there was commonly opalescence of the upper surface of the cerebrum—seemingly of the subarachnoid fluid; increased vascularity of the meninges of the brain and spinal cord, especially the pia mater; a large increase of serum, clear or turbid, and mixed with flocculi of lymph, in the subarachnoid space and ventricles, with, most usually, even in cases of the shortest duration, an abundant exudation, at the base of the brain and medulla oblongata, of thick, yellowish, apparently semi-organized lymph. Conjoined with these lesions there was more or less passive congestion of the lungs, increase of the pericardial fluid, and occasional engorgement and enlargement of the liver or spleen. When the disease had lasted from seven or eight days to several weeks, the deposits on the brain were usually more marked, especially at its base, around the pons Varolii, in the sulci of the cerebrum and cerebellum, covering the surface of the oblongata, and extending down upon the spinal cord, sheathing it, in some cases, throughout its entire extent. The deposit was either puriform, or concrete and semi-organized, and, frequently, from two to three or four lines in thickness. It was found also in the ventricles, especially in the posterior cornua of the lateral ventricles, in its concrete form, or else tinging and thickening, with an opaque greenish pus, the serous fluid of the whole cavity. The meninges of the brain, the pia mater especially, showed, not unfrequently, evidences of congestion. The only lesions noticed in the thoracic and abdominal viscera, were passive engorgement of the lungs in

their depending portions, the occasional presence of lymph in the pericardium and ventricles of the heart, and sometimes enlargement of the liver and spleen.

In two cases reported by Dr. Jewett, the one terminating in twenty-four hours, the other in twenty-three days: in the first the lesions were, adhesion of the meninges, either between themselves or to the surface of the brain, requiring them to be torn at certain points from the surface of the latter; the arachnoid space filled with straw-coloured serum, to the extent of perhaps three or four ounces; effusion into the lateral ventricles, especially the right, congestion of entire surface of brain, with small patches of lymph at base of cerebellum. In the spinal canal, a greatly increased quantity of cerebro-spinal fluid, of a yellowish and milky hue; meninges much congested, and the cord itself softened. In the second case the dura mater was strongly adherent over the longitudinal sinus, the lateral ventricles were filled with about three ounces of straw-coloured fluid; vessels of choroid plexus strongly injected; the fourth ventricle filled with serum and pus: a large deposit of lymph, three lines in thickness, covering the pons Varolii and inferior surface of the medulla oblongata. The meninges of the cord much congested; about half an ounce of sero-purulent fluid in the spinal canal; the spinal cord enveloped in a layer of lymph, in some places two or three lines in thickness, extending down, and sheathing to their very extremities, the cauda equina and sacral nerves.

Of the seven fatal cases recorded by Dr. Cowgill; in one where death occurred within thirty-six hours, there was cloudiness of the entire surface of the cerebrum and medulla oblongata, increased vascularity of the meninges, effusion of serum into the ventricles, injection of the pia mater of the spinal cord, evidences of inflammation along the whole course of the latter, with effusion of turbid serum in the lower part of spinal canal. In another case of thirty-four days' duration, there was injection of the pia mater, exudation of yellowish lymph along the sulci of the upper surface of brain, and a thicker deposit, of apparently plastic semi-purulent matter, on its inferior surface, especially over the pons Varolii and oblongata, with two ounces of serum in the lateral ventricles. In the remaining five cases, which were intermediate in duration, the lesions were, increased vascularity of the meninges, especially the pia mater; a thin deposit of lymph on the upper surface of the brain, in two of the cases; in three, a more abundant and consistent deposit of lymph-like matter at the base of the cerebrum, cerebellum and medulla oblongata, extending into the spinal canal in the form of either lymph or a sero-purulent fluid. In all the cases, there was distension of the ventricles with serum or sero-purulent matter.

In five cases that terminated fatally on or before the third day, observed by Dr. Upham, the lesions were, in two cases, congestion of meninges of brain; in three, extensive deposit of lymph at the base of the brain, especially of the cerebellum; in one, slight cloudiness, confined to the superior surface of the cerebrum, with some opacity of the arachnoid; in one there was absence of all abnormal deposits. In two cases, which lasted thirty-four and thirty-six days respectively, Dr. U. detected, in the first, cloudiness and slight deposit of lymph between the convolutions of the cerebrum, and a firm layer of coagulable lymph, two lines in thickness, on the lower surface of the cerebellum and oblongata; in the second, some increase of vascularity of the pia mater; a thin, milky fluid beneath some portions of the pia mater; on the upper surface of the brain, and at its base, a mass of tenacious yellowish lymph, three-eighths of an inch in thickness, extending down upon the spinal cord. In both cases the ventricles were distended with a sero-purulent fluid. In the six intermediate cases the lesions were, more or less congestion of meninges in three; in one only clouded appearance of arachnoid, and in five copious effusion at the base of the brain and medulla oblongata.

In respect to the true character of the disease under consideration, Dr. U. remarks that, from the limited number of cases that have been adduced, no definite conclusion can be arrived at, but he believes that by the process of exclusion, we may be able to approximate towards the truth.

"That it was not, in its essential essence and primarily, an inflammation of the membranes of the brain and spinal cord, it seems fair to conclude, Dr. U. thinks, from the failure of all the known means of combating such disease in

producing any adequate result. Venesection and local bleeding had alike no control over the violence of the disease. Blisters were not well borne. Calomel and saline cathartics in large doses produced no good effect. The outward demonstrations of the disease, if carefully studied, would seem to be rather the results of some subtle agency that had suddenly overwhelmed with its depressing effects the vital powers, than the excited and painful expressions of active inflammation." "The disease lacks, also, many of the important symptoms and other characteristics of the 'congestive fevers' of tropical climates. It is not intermittent, nor uniformly or commonly remittent. It occurs at a season of the year when miasmatic diseases do not prevail, and among the new troops who have not been previously exposed to malarial influences, by preference. It does not yield to, nor appear to be favourably influenced by, quinine, however early and perseveringly administered. The anatomical lesions, in the cases examined, which, other things being equal, would seem to accord with the supposition of its malarial origin, are the rare exception, not the rule.

"The disease seemed to Dr. U. rather to partake of the nature of typhus, in a severe and malignant form, identical in its essential elements with the typhus fever of Great Britain, which, under the names of maculated typhus, ship, camp or jail fever, has many times been observed in this country—having, in this instance, a special direction to the meninges of the brain and spinal cord, as, in other epidemics, the weight of the disease has fallen at one time upon the brain, at another upon the lungs, or other important viscera of the thorax, or of the abdomen. Springing up epidemically or otherwise, wherever there is long-continued crowding and exclusion of light and air, coupled with deprivation, hardships and exposure. In the disease under consideration, the circumstances of its origin are similar in kind, if not in degree, to those under which the typhus group of diseases most frequently originate. Very many of its phenomena and phases correspond with those witnessed in typhus epidemics. The suddenness of its accession, the dusky hue of the face, the suffused and injected eyes, the petechial eruption, and purpural spots, the defective innervation of the respiratory and circulatory systems, as shown by the laboured, irregular breathing, and the often tumultuous and intermittent action of the heart, the sluggishness, but in other respects general freedom from functional derangement of the thoracic and abdominal viscera, and, after death, the passive engorgements, and the dark-fluid, sizy, character of the blood, all point to the typhus element of the disease, and would seem to indicate a line of therapeutical management similar to that which experience has found most effectual in the treatment of that malady."

In respect to the treatment pursued in the cases to which the notes and memoranda before us refer; in the beginning of the epidemic it being considered of malarious origin the usual remedies in such affections were assiduously employed. Quinia, in some cases to the extent of from sixty to eighty grains, was given within ten or twelve hours from the first attack, but with no good result; in conjunction, stimulants and purgatives of calomel were freely used. Antiphlogistic remedies were also tried—cupping, wet and dry, to the back of the head and nuchæ—saline purgatives; epispastics to inside of thighs, calves, and ankles; frictions along the spine, with enemata of turpentine and brandy. When there was marked cerebral excitement venesection was most freely employed, but without averting or mitigating the symptoms. Calomel in combination with ipecac. in doses of two grs. of the former, and half a gr. of the latter, repeated every two hours, in conjunction with frictions or sinapisms along the course of the spine, seemed, in several cases to have had a good effect. Ergot, recommended by Dr. Brown-Séquard in certain affections of the spinal cord unaccompanied with active inflammation, was given in the form of fluid extract, in doses of from ten to fifteen minims, every four hours. Several of the cases thus treated recovered. Often a beneficial effect attends the use of camphor water in combination with carbonate of ammonia. Dover's powder and solution of sulphate of morphia were given at night to induce sleep.

D. F. C.

ART. XIX.—*Manual of Instructions for Military Surgeons, on the Examination of Recruits and Discharge of Soldiers.* With an Appendix, containing the Official Regulations of the Provost Marshal General's Bureau, and those for the formation of the Invalid Corps, etc. etc. Prepared at the request of the United States Sanitary Commission, by JOHN ORDRONAUX, M.D., Professor of Medical Jurisprudence in Columbia College, New York. New York: D. Van Nostrand, 1863. 12mo. pp. 238.

2. *A Manual of Instructions for Enlisting and Discharging Soldiers.* With special reference to the Medical Examination of recruits, and the detection of disqualifying and feigned diseases. By ROBERTS BARTHOLOW, A. M., M.D., Assistant Surgeon U. S. Army; Surgeon in charge of McDougall General Hospital; Professor of Mil. Med. Jurisprudence, Army Medical School. Adopted by the Surgeon-General for issue to medical officers of the army. Philadelphia: J. B. Lippincott & Co., 1863. 12mo. pp. 276.

1. THE Manual of Dr. ORDRONAUX is, for the most part, as he himself states in the preface, a free translation of the French code of instructions upon the infirmities or diseases that unfit a man for military service. In the appendix attached are published the code of instructions relating to the United States Army, recently adopted by the Board of Medical Officers convened in Washington; the Regulations governing the formation of our Invalid Corps; the Prussian list of disqualifying diseases, and the Regulations governing the formation of their Invalid Corps.

As our army is now to be composed of drafted men instead of volunteers, the regulations adopted after abundant experience in France and in Prussia, where every man not disqualified must serve in the army, are those that are to be followed in this country. Formerly in examining a recruit, the object was to detect a concealed infirmity; at the present time the object is to prevent the simulation of physical disabilities. The volume by Dr. Ordronaux will be found exceedingly useful by officers who are concerned in the recruiting or discharging of soldiers.

2. The Manual of Dr. BARTHOLOW is evidently the production of one who has enjoyed very considerable experience in this country as a military surgeon, and who also knows how to avail himself of the labours of others. Medical officers, and all those engaged in the recruiting service of the United States, who are without experience, could not possess a work better calculated to aid them in the discharge of their duty. We have read the work carefully, and with great pleasure and instruction, and we have rarely been more favourably impressed with an author's knowledge, judgment, and correct appreciation than in the present instance. This little volume is a valuable addition to the library of the military surgeon, and its teachings may be implicitly relied on. W. F. A.

ART. XX.—*Consolidated Statement of Gunshot Wounds.* By JOHN H. BRINTON, Surgeon U. S. V. Surgeon-General's Office, Washington, July 1, 1863. 8vo. pp. 11.

THIS pamphlet contains tabular statements of the gunshot injuries treated in the United States Army General Hospitals during the months of September, October, November, and December, of the year 1862. These tables have been compiled by Dr. Brinton by the aggregation of the consolidated tabular statements of nearly all of the army general hospitals for the months specified. They are now published in a separate form, in advance of more extended details illustrative thereof, by the desire of the Surgeon-General, for the information of the medical officers of the army, and of the profession at large, and are to be considered, as this distinguished officer states in a prefatory cir-

cular, as an earnest for the future of still larger and more valuable contributions to the literature of Surgery.

The entire number of cases of gunshot injury reported is 20,930; and the tables set forth respectively, the Seat and Character of the Wounds, with the result; the Treatment; the Character of the Missiles; the Amputations performed; the Excisions performed; the Extraction of Balls; the results of thirty-five cases of Trephining; the Ligature of Bloodvessels; and the Miscellaneous Operations.

The preparation of tables such as these demands an extraordinary amount of zeal, industry, and caution, in order to make them correct. The value we set upon them must depend in a very great measure upon our estimate of the character of the person by whom they have been compiled, and it is needless to say that no one can be more deserving of the confidence of the profession than the compiler of these tables—Dr. Brinton. W. F. A.

Art. XXI.—*Transactions of the Obstetrical Society of London*, Vol. IV. For the Year 1862; with a List of Officers, Fellows, &c. 8vo. pp. 338. London, 1863.

The present volume of the Transactions of the Obstetrical Society equals fully, in the interest and practical value of its contents, either of its predecessors. Of several of the papers comprised in it, very full abstracts have already been given in our quarterly summaries for the past year.

The annual address of the President, Dr. W. Tyler Smith, contains no suggestions directly applicable to the condition of the profession in this country—none, at least, which could be successfully carried into practice without a radical change in the political institutions under which we live; we shall pass it by, therefore, and proceed at once to a brief notice of such of the papers contained in the volume as have not already been noticed in preceding numbers of the *Journal*.

Dr. G. Hewett, of London, relates a case of *spina bifida* (pp. 5, 6), occurring in a child delivered by one of the midwives of the British Lying-in Hospital, October, 1861. The labour was easy, and occurred at full term. The mother stated that she had had a fall two months previously. The child, a female, presented no defect save that the spinous processes, which were readily recognizable by the finger as far as the junction of the lumbar and sacral regions, were, with the entire bony arch over the middle of the sacrum, defective. At this spot was situated a tumour, smooth, soft, easily compressible, measuring one and a half inches across, and raised above the surrounding surface three-quarters of an inch. It evidently contained a fluid, which oozed *guttatim* from a minute aperture in the skin covering it. Two days after birth Dr. H. found the greater part of the skin covering the tumour of a deep red colour—one portion, however, was of a yellowish hue, and if not already gangrenous, threatening to become so. The tumour was felt under the skin to be surrounded by a slightly elevated bony margin. Its fluid contents could be made in great part to pass inwards by pressure. The general condition of the child was good, the movement of its lower extremities unimpaired, its body warm; it sucked vigorously and slept well. Pads were applied on each side the tumour to guard it from external friction or pressure, more active treatment being deferred until the skin covering it should assume a more healthy aspect.

For the first six days the patient went on well; it then, however, became weaker as regarded its power of sucking, convulsions set in, and twelve days after birth death took place. The case when first seen seemed to be a favourable one for an attempt at cure. It was hoped that by carefully guarding the skin against friction, by the use of collodium, and slight pressure kept up by bandages, retraction of the sac might have been produced.

Another case of spina bifida is reported by Dr. D. Richards, of Brighton; of which the history is given in a subsequent part of the volume (pp. 191–94).

It will be more convenient, however, to notice it in connection with the foregoing. In this second case the defect in the spine became associated with hydrocephalus.

The patient, a female, was the first-born of a strong, healthy, well-formed mother. At the lower part of the dorsal region spina bifida existed, with an absence of three entire spinous processes. The integuments also were wanting, so that there existed an opening instead of the usual tumour filled with a fluid—the spinal column being apparently exposed to about one inch in depth. Angular curvation of the spine at this part was present; the palate was cleft, and there was talipes varus of both feet; the head at birth was healthy and of normal size.

Immediately after birth, the aperture in the back began to close by granulations. At the end of twenty-eight days the left leg descended from the shoulder to its natural position; two weeks subsequently the right leg partially descended. The cavity in the spine had now become entirely closed up with granulations level with the surrounding skin. The granulating surface in wet weather appeared wet and inclined to throw out a thin discharge, while in fine weather the surface looked dry and as if covered with skin.

As the cavity closed, the infant's head was observed to enlarge. Thirty-one days after birth its circumference was 18¼ inches; two weeks subsequently it was 18¾ inches; two weeks later, 19 inches; at the end of another two weeks, 19½ inches; two weeks later, 19¾ inches; while at the end of the next three weeks it had a circumference of 23 inches. At this size, very nearly, it remained for over ten weeks, when a diminution was observed. A slight anasarca, which had existed for a short time, began at the same time also to diminish, and by the end of five days had altogether subsided. The size of the head was now reduced to that which it presented at birth, and the aperture in the spine was completely healed. Six days later, five months and seven days subsequent to birth, the child died from exhaustion. No examination of the body was allowed.

The second paper in these Transactions is *A Report on Mr. Spencer Wells' Case of Exfoliation of the Female Bladder*, by Dr. Harley. (pp. 13–17.)

The specimen sent to Dr. H. for examination was passed, it is stated, by the urethra six weeks after a severe instrumental labour. From the time of delivery up to the period when the specimen was voided the patient was confined to her bed, with symptoms of acute cystitis, associated with nephritis. The urine, examined about three weeks after delivery, was albuminous, and contained blood corpuscles, pus cells, chylous matter, and renal tube casts. At the same time the fresh urine was very much loaded with carbonate of ammonia, and was intensely alakline, even at the moment when passed. This condition of the urine would alone, in the absence of all other evidence, be sufficient to justify the diagnosis of cystic and renal disease. An examination per vaginam the day before the specimen was expelled detected nothing in the vagina; shreds of a sloughy-looking tissue were, however, observed to project from the orifice of the urethra. A hard swelling had been felt in the anterior wall of the vagina, supposed by one practitioner to be an abscess, by another, a foreign substance in the bladder. After the discharge of the substance the patient's health rapidly improved. She is married, and there is no apparent cause for suspecting her of deceit.

The specimen is an animal membrane, in the form of a bag, perfect on all sides save one, in which are several irregular rents. Exteriorly its colour is white, and even to the naked eye distinctly muscular. The muscular fibres, upon close inspection, were found to be of the involuntary kind, and distributed in the same interlacing manner as in the urinary bladder. Interiorly the bag is of a dark colour, and covered throughout with a gritty deposit, the removal of which brought into view a smooth, mucous surface. The gritty matter upon analysis proved to consist of crystalline phosphates and urates. Upon the muscular coat of the specimen were found, under the microscope, a number of tube casts and granular cells. But, as Dr. H. remarks, as the specimen had been in water for two days, these may have been accidentally floated out from the interior of the organ. On minute inspection of what seems to be its outer surface, there is seen an irregular patch, of about two inches by one in extent, of smooth tissue, bearing a close resemblance to serous membrane, being, probably, a por-

tion of peritoneum. The distilled water in which the specimen was steeped for two days, deposited a quantity of phosphate of lime, and of urate of soda and ammonia. The supernatant fluid had a milky appearance, resembling lime water, which it retained even after filtration. Neither ureters nor their orifices were to be detected in the specimen. It was impossible to ascertain whether the specimen is an entire organ, or only the portion of an organ, in consequence of the torn condition of its lower part.

From the foregoing data Mr. H. is led to the conclusion that the specimen is a portion of a urinary bladder, which at one part is, probably, of its entire thickness—as it appears to possess at this part, an internal mucous, a middle muscular, and an external serous coat.

Taking it for granted that the specimen in question was to be viewed as a true pathological specimen, it appeared to Dr. H. that we must accept as true one or other of the following theories :—

"1st. That a woman voided, by the natural passage, nearly her whole bladder. Or, 2d. That the entire mucous membrane, with nearly the whole of the muscular coat, had become, by some means or other, dissected from the neighbouring tissues, and exfoliated in the form of a perfect cast."

Dr. Tanner referred to a case, the exfoliated membrane obtained from which is preserved in the collection of the Royal College of Surgeons, which is adapted to throw light upon the foregoing—bearing out the correctness of the second of the theories proposed by Dr. Harley.

Dr. J. G. Swayne related a curious case of *discoloration of the skin during pregnancy* (pp. 18, 19). The subject of the case was a blond, with rather florid complexion, brown hair, and blue eyes, twenty-six years of age. Had always enjoyed good health. After her fourth labour, Dr. S. observed a very general discoloration of both forearms and hands, much more marked, however, upon the dorsal than on the palmar aspect. It was most intense at the wrist, where the skin was of a rich, yellowish-brown hue, as dark as that of the mulatto. From the wrist it became gradually paler, until at the elbow, the skin regained its normal colour, but so gradually as to render it impossible to indicate any line of separation between this and the morbid tint. At the wrist, however, the line of demarcation was very distinct, the colour being deeper and extending further on the dorsal than on the palmar surface. On the backs of the hands and fingers it assumed the form of isolated patches, with irregular crescentic outlines, and occupied chiefly the knuckles. The patches coalesced on the forearms, giving to them a more uniform dark tint; still the patches, having irregular concave edges, could be traced, inclosing, here and there, circular patches of white skin. A similar discoloration of the skin had been present in each of the lady's preceding pregnancies. The dark colour first appeared towards the end of the third month, and gradually increased until labour set in. After delivery it soon began to diminish in intensity, and at the end of three months had disappeared. The lady's mother had borne two children, and in each of her pregnancies both the arms and neck presented the same form of discoloration.

Henry Raynes, Esq., of Gringley, reports a case of *difficult labour from the locking of the heads of twins* (pp. 19, 20), analogous to the one described in the last volume of the *Transactions* by Dr. Pollock.

Labour had considerably advanced before Mr. R. was called in. The breech presenting was promptly converted into a footling case. The further progress was impeded by the locking together of the heads of two children, which were reversed so as to allow of the inferior margins of the lower jaws being placed in juxtaposition. Mr. R. excised the head of the child whose body was born, and which was ascertained to be dead. The head of the other child being in advance of the first, retained its place until after the birth of the latter, the detached head of which retiring above the brim, permitted the progress of the second child, which was born without manual assistance, and expired soon after birth. The detached head of the first child was now extracted by a little manipulation, the fingers of the operator being inserted in its mouth.

Dr. Pollock's case, already referred to, and one by Mr. Eaton, noticed in *Braithwaite's Retrospect*, vol. xiv., are the only other cases similar to that of Mr. Raynes, which are known to be on record.

A case of *retained menses* of two years' duration, *from atresia vaginæ: puncture of rectum followed by recovery*, is related by I. Baker Brown (pp. 21, 27).

Where there is a deficiency or entire absence of the vagina in a young female, unattended with arrest of development of the uterine organs, pain and other evidences of an effort to menstruate may recur monthly, and pass off without the patient suffering any serious inconvenience. There is a liability, however, of a constant accumulation of the menstrual fluid, giving rise, ultimately, to constant painful distension of the uterus, for the relief of which surgical interference will be demanded. Such cases are, confessedly, of rare occurrence; in the majority of them the attempt made to afford relief by puncture, or otherwise, has had an untoward result. The general opinion of surgeons is that, when the uterus is punctured through the rectum death almost invariably occurs; how far this opinion is borne out by facts it is impossible to say. Dupuytren has opened the closed womb through the vagina in several cases. Inflammation of the uterus of so severe a character ensued that he finally abandoned the operation, allowing the patient to die quietly and slowly, rather than to accelerate her death by an operation. Since his time, however, the womb has been punctured on many occasions through the vagina without a fatal result.

In cases of complete atresia vaginæ the discharge of the retained menstrual fluid can be effected only by an operation per rectum. That this may be done effectually and safely, the case related by Mr. Brown proves satisfactorily. The subject of the operation was an unmarried female, 15 years old, well developed and of good constitution. An attempt had been made to form an artificial vagina, which failed in consequence of the extremely small amount of tissue to work upon. The operation per vaginam was followed, for a few days, by occasional attacks of pain, chiefly produced by the slow contraction of the uterus. Some degree of pain was due, also, to the efforts at natural menstruation. The appearance of healthy catamenia took place on the evening of the fourth day after the operation and during the next day. Pain also preceded the second menstruation for some days. There was not the slightest appearance of irritative fever. The general result of the operation is looked upon as extremely favourable.

On the *Uterine douche as a therapeutic agent*, with description of a new instrument for its application. By Dr. G. Hewitt. (pp. 27–30.)

The beneficial effects of the cold douche applied to such portions of the uterus as are accessible to its action from the vagina in several of the diseases of that organ has been long recognized. It is nevertheless true, that the uterine douche is but rarely employed by the profession at large. One reason why this is so, Dr. H. believes to be the want of a ready and efficacious mode of administering it. To employ the douche effectively an instrument is required at once portable, requiring no mechanical or other effort on the part of the patient, and admitting of the use of a large quantity of water. Such an instrument Dr. H. describes. It consists of a gum-elastic bag, capable of holding nearly a gallon of water, and of folding up when empty. From the bottom of this bag proceeds a long flexible tube. When expanded it is so maintained by a brass rod screwed in its centre. The action of this instrument depends on gravitation. All that is necessary is to place the bag a foot or two higher than the seat or couch occupied by the patient. The stopcock being opened a continuous flow of water, fast or slow, as is desired, takes place through the tube, the free end of which is inserted into the vagina.

Irrigation of the os and cervix uteri by means of this instrument, Dr. H. recommends as particularly advantageous, in cases of profuse menstruation with a lax condition of the uterine vessels, giving rise in many cases to prolapsus uteri; chronic leucorrhœa from the same cause; enlargement of the womb from defective involution after abortion or delivery—engorgement of the lips of the os uteri, associated with a hypertrophied condition of the mucous membranes, and excessive secretion of the mucous follicles of the cervix; in all cases, indeed, in which there is undue fulness of the uterine vessels, or defective tonicity of the muscular fibre generally.

On the *Thrombosis and embolia of lying-in women*. By Dr. Robert Barnes, of London. (pp. 30–53.)

By recent pathologists, many of the diseases incident to the puerperal female, are referred to certain abnormal conditions of the blood. Two of these diseases more especially form the subject of the communication before us. In the first of these the patient, at a period more or less approaching that of delivery, is seized with the faintness, intense pain in one or more of her limbs, followed by swelling, arrest of pulsation, loss of heat, gangrene, and it may be death. The morbid conditions antecedent to the sudden occurrence of such a series of severe and always dangerous phenomena, without an acquaintance with which no rational prophylaxis can be inaugurated, are yet to be developed through a carefully conducted course of clinical observations. In all the cases marked by the phenomena referred to, where a post-mortem examination has been made, blood clots have been found in the main arteries of the affected limbs.

Another class of cases are marked by sudden faintness, irregular action of the heart, distressed respiration, rapidly increasing collapse, and speedy death. In these cases it is found that the pulmonic circulation is almost exclusively concerned, and clot-obstructions are met with in the right heart and pulmonary arteries. Of the causes which give rise to this coagulation of the blood and the formation of embolia, we know little or nothing.

Dr. Barnes relates in detail a case belonging to the first class referred to, and then presents in tabular form the abstract of fifteen other cases he has met with on record. These cases offer several features of similitude as well as of apparent variation. Five were preceded by rheumatism, a disease which in the non-puerperal has been frequently found associated with embolia; in one of these cases the symptoms in the limb occurred six hours before labour. The earliest period of attack after labour was on the second day, the latest seven weeks. In eight cases indications of gangrene occurred within fourteen days. In twelve fatal cases, death ensued in from eleven days to three months. Recovery took place in two cases.

"It is clear," Dr. B. remarks, "from the history of these two cases, and from what is known of the history of aneurism and other forms of arterial obliteration, partial or complete, that a collateral circulation may, under favourable circumstances, be established; or that, if gangrene be not averted, the necrosed portion may be thrown off, life being preserved by the sacrifice of a part of the body. Indeed, it has been observed that the arteries are not always completely obstructed by the clot. A space sufficient to permit the passage of a limited stream of blood may remain open. In this circumstance, and the simultaneous extension of the collateral streams is a ground for the hope of recovery."

Death may take place in the primary stage during the commotion consequent upon the coagulation of the blood in the left heart, or so early after the transport or formation of coagula in the arteries as to anticipate the occurrence of mortification.

In two cases amputation was resorted to—in one successfully—a line of demarcation having been established.

In some of the cases there were, apparently, certain premonitory symptoms, whether of the formation of heart-clots or of their transmission into the arteries; such as dyspnœa, syncope, and irregular action of the heart. The earliest condition, recorded in the majority of cases, however, is pain in the limbs subsequently affected, and generally of the most excruciating kind. This has usually remitted when mortification appeared: pulsation ceases in the arterial trunks leading to the affected limb. In cases complicated with rheumatism signs of cardiac disease have been diagnosed.

In all the cases collected by Dr. B. one or more of the limbs were affected. In three the right arm and both legs; in one, the right arm and leg; in another, the left arm and both legs; in another, the left arm and leg; in another, the right leg; in two cases, the left leg.

The embolia may doubtless be carried to the brain, as well as to the liver, spleen, kidneys, heart, and eye

"The cases," remarks Dr. B., "may be divided as to their post-mortem appearances, into two classes:—

"1. In those in which rheumatism was an antecedent condition there have been found the effects of endocarditis; the valves of the left side of the heart

have presented wart-like excrescences. In these cases it has been presumed that the accidents of local arterial obstruction were not always, or, at least, not exclusively, due to the sudden formation of fresh coagula in the heart, but chiefly to the detachment and washing away into the arterial system of portions of the valvular vegetations."

"2. In cases not complicated with rheumatism or previous disease of the heart, there is evidence to show that blood has suddenly clotted in the cavities of the heart, that the commencement of the mischief was in the heart, and that the local obstructions were the result of the detachment and washing away into the arteries of portions of the heart clot." "In cases where pain in a limb, or other local distress has been the first thing observed, the conclusion that the coagulation did not commence in the heart would be far from certain. At the same time analogy points out that the formation of obstructing coagula in the large arteries is not impossible."

Dr. B. proceeds next to the consideration of thrombosis or embolia of the pulmonic circulating system, which is often associated with a similar affection of the systemic arterial system. In the latter the disease, as we have seen, commences in the heart; there is primary central thrombosis and secondary peripheral embolia; while in the former, which is the most frequent, there is generally primary peripheral thrombosis, secondary cardiac implication, and tertiary embolia of the pulmonary arteries.

The abstract of fourteen cases found upon record of pulmonary thrombosis or embolia is presented in tabular form, and a probable case is detailed.

In six of these cases clots existed in the crural, iliac, hypogastric, or uterine veins; signs of phlebitis or uterine inflammation had preceded, often by long intervals, the symptoms of pulmonary distress. The first or peripheral symptoms were noted from twenty-four to seventy-two hours after labour; the secondary or pulmonic in from four to upwards of twenty after labour. Death occurred in from four to twenty-eight days after labour. In eight cases attended with great precordial distress, dyspnœa, and syncope, death was more or less sudden. In these cases it was generally found that the main branches and smaller ramifications of the pulmonary artery were clogged by coagula, while blood clots were present also in the right heart. When death occurred less promptly, symptoms of pneumonia had time to develop themselves, and in these it was found that the smaller ramifications of the pulmonary artery were obstructed.

"It seems," Dr. R. thinks, "reasonable to conclude that the sequence of events in pulmonic embolia is as follows:—

"1. There is dyscrasia of the blood immediately proceeding from the puerperal process, which is favourable to the production of clots in the uterine veins and veins of the lower extremities. Imperfect contraction of the uterus, the formation of putrilage in the uterine cavity from the admission of air, which acts upon the blood and serum squeezed out of the vessels, and the remains of adherent placenta or of decidua, are often the immediate antecedent conditions of peripheral thrombosis. This process is also favoured by the retardation of the circulation in the veins of the uterus and lower extremities, resulting from pressure."

"2. Portions of the peripheral thrombi, attended no doubt, in many cases by septic matter derived from the uterus, are carried to the right heart. If the solid matters be large enough, or the septic or ichorous matters be irritating enough to cause a violent perturbation of the heart's action, and to act chemically upon the blood mass, rapid coagulation of blood in the right cavities may ensue, followed by a similar process in the larger pulmonary arteries. In such cases sudden death occurs.

"3. In cases in which either minute portions of thrombi are taken up from the peripheral veins, or where the septic or ichorous matter is less virulent, no clot may form in the right heart, but minute emboli may be carried into the finer divisions of the pulmonary artery, causing lobular pneumonia, ending in slower death, or possibly in recovery. Pure thrombosis of the venous system—that is, uncomplicated with blood dyscrasia or fever—is not often fatal. It can only become dangerous when, from some accident, portions of peripheral clots

are carried to the heart." "As far as careful dissection can show, there seems good reason to conclude that obstruction of the pulmonary arteries may occasionally arise from *primary*, sudden or gradual, formation of clots in those vessels themselves."

"4. In many of these cases some mental emotion or sudden exertion has immediately preceded, and has seemed to be the exciting cause of the cardiac and pulmonic distress. It seems to me that this association may be explained by the temporary retardation of the blood current which is occasioned, and which offers a momentary facility for the chemical action of the septic or ichorous matter upon the blood. Possibly, also, sudden exertion may favour the detachment of portions of thrombi from the systemic veins. Whatever may be the explanation adopted, it is difficult to avoid the conclusion that in some of the cases the fatal catastrophe might not have occurred had the patient been kept in a condition of mental and bodily repose."

In respect to treatment in cases of puerperal thrombosis and embolia, our main attention should be directed to prophylactic measures. Care should be taken to secure a healthy condition of the blood during pregnancy, by regular exercise in the open air, thorough cleanliness of the entire skin, a good generous diet, and occasional doses of aperient medicine. During labour care should be taken to insure the due and regular contraction of the womb, avoiding as much as possible the kneading or rather bruising process too often practised, and the irregular contraction apt to be produced by ergot. After delivery, lactation should be encouraged; nothing acts with equal efficacy in maintaining healthy contraction of the uterus, and promoting its regular involution; thus averting many puerperal disorders. The recumbent position should be enforced, all causes of mental or bodily disturbance guarded against, and a generous unirritating diet supplied.

When the disease is actually present, the same general treatment is to be continued, adding bark, stimuli, and the mineral acids, especially the nitro-hydrochloric. Dr. B. disapproves of the administration of ammonia. Amputation of the diseased limb cannot, he thinks, be safely resorted to, excepting in a very few exceptional cases—possibly, those of a post-rheumatic character.

The importance of the subject discussed by Dr. Barnes—the fulness and general excellence of his exposition of it, has induced us to present a very full analysis of his monograph on puerperal thrombosis and embolia, for which we shall receive the thanks of our readers, as but few of them can have the opportunity of consulting the paper itself.

Mr. I. Baker Brown reports the results of the *operation of ovariotomy* at the London Surgical Home, and the mode of operating (pp. 59–86). Nineteen cases are presented in tabular form, in thirteen of which the operation terminated favourably, and in six death ensued. To those who feel an interest in the subject of ovariotomy we recommend a careful perusal of the report and remarks of Dr. Brown, in connection with the discussion to which the reading of the report gave rise.

Dr. Robert Barnes presented a specimen of *an ovum in ovo* (pp. 87–89). It was an egg laid by a hen in South Wales, containing within it another perfect egg, enveloped in its own shell. The outer shell is of a dull chalky white colour, without gloss or polish, similar to the egg of the Dorking fowl; the shell of the inner egg is of a red tint, like that of the Cochin fowl and partridge. Of these double eggs the same hen has laid, at irregular intervals, nine alike in every respect, even to the colour of the shells.

T. Spencer Wells, Esq., related a *case of ovariotomy*, with a reply to a statement respecting it, made by Mr. Baker Brown at a former meeting of the Society. The case and remarks of Mr. Wells should be read in connection with Mr. Brown's paper on ovariotomy, noticed above (pp. 89, 90).

Dr. J. Hall Davis describes a very unique case of *retention of the menses after difficult labour from complete occlusion of the os uteri* (pp. 91–96). Upwards of fifteen months after delivery the menstrual flux had not reappeared. The patient had had a thick yellowish discharge from the vagina; she suffered at times from pains in the abdomen; always felt uncomfortable, dull, and heavy; was soon fatigued; could not lie on her back; driving over uneven ground was

painful to her. Nearly three months subsequently, the uterus could be felt above the pubes, enlarged to the size of a four months' gravidity. A soft, somewhat elastic prominence of the uterus was perceived at the top of the vagina, with distinct fluctuation. The bowels having been regulated, the uterus was punctured with a canulated stilet at the most salient point of this prominence, in the axis of the organ, and to the depth of a quarter of an inch. The stilet was then withdrawn, and the canula passed into the uterus, when a portion of the retained catamenial fluid escaped, of the consistence of treacle, and unoffensive. To cause a freer discharge the aperture was slightly enlarged on each side with the hysterotome; six ounces of the fluid then came away, and more the next day. The aperture was maintained by leaving in it a No. 12 gum elastic catheter for two hours daily. The patient caught cold after the operation, and suffered from pain and other disagreeable symptoms; and after passing through a period of much danger, had regained her normal state, with regular menstruation, at the end of three months subsequent to the operation.

On the *nature and treatment of puerperal peritonitis*, by Joseph T. Mitchell (pp. 96–105). Among 4349 recorded cases of labour attended by Mr. Mitchell, there occurred 27 cases of well-marked puerperal peritonitis, of which in all but four the termination was favourable. Mr. M. had never encountered epidemic puerperal fever, and in no one case seen by him could he trace its origin to contagion. All the cases were treated at the patient's own residence. The treatment pursued by Mr. M. was bleeding to a greater or less extent, followed by large doses of opium; rest in the recumbent posture; with extensive counter-irritant applications (fomentations of hot water and turpentine, or sinapisms) over the entire surface of the abdomen.

The remarks of Dr. Routh upon the paper of Mr. M. made at the meeting when it was read, appear to us to be especially pertinent and correct; we therefore present them entire:—

"Dr. Routh said he should be sorry to learn that the profession had been influenced by Mr. M.'s paper to treat all cases of puerperal peritonitis by bloodletting. Casual cases met with in private practice were very different from those occurring in lying-in hospitals. There were, moreover, several varieties of the disease, the dynamic and adynamic, the contagious and non-contagious, etc. In his early career Dr. R. had seen a fearful epidemic in Vienna, where sometimes six hundred died a year. That fever was found to be non-contagious, and caused by direct inoculation of dead matter carried from the dead-house beneath the nails of the medical attendants. All kinds of treatment had occasionally succeeded—generally, however, had failed. In some examples, in which a particular kind of *facies* made its appearance, it could be surely foretold that death would occur, in spite of every treatment. In others, in which such facies was not observed, instances of recovery could be found under all kinds of treatment. The fatal cases gave indications of blood poison. Almost the first thing observed, even before the mother became seriously ill, was the sudden death of the infant with narcotic symptoms—poisoned by the breast milk. In these the effusion of false membranes and serum into the abdominal cavity was so rapid as to seem rather the result of decomposition of the blood than of inflammation. An acid state of the serum was to be noted in other examples. Bleeding in such cases was contra-indicated by all known physiological rules. As also in puerperal peritonitis, which prevailed at the same time with erysipelas. He believed that every epidemic, as well as every case, was to be studied by itself, and treated upon broad general principles, and not necessarily by bloodletting as a panacea."

Dr. Thomas Skinner presents some brief remarks on *anæsthesia in labour* (p. 116), the object of which is to show the safety with which chloroform can be employed to relieve the pains of parturition, and to exhibit a simple apparatus by which anæsthetic agents might be economically administered. In commenting upon Dr. S.'s remarks, Dr. G. Hewitt considered it important that the duration of labour in cases in which chloroform was given should be stated. He had found that chloroform sometimes exercised a most decided effect in putting a stop to the progress of labour, and that in cases where anæsthesia from other causes was most desirable.

A practical inquiry into *the properties of nitrate of silver*, with *an account of a new instrument for its use in uterine disease.* By Robert Ellis (pp. 116—128). After showing the caustic nature of the nitrate of silver, and the causes by which its action upon the living tissues as an escharotic, is limited; after enumerating, also, in brief terms the invaluable part it plays in the treatment of many affections of the uterus, whether simply as an alterative of diseased action or in the destruction of diseased tissue, and pointing out the unadaptedness of the lunar caustic of the shops, in consequence of its brittleness, for application as a decided escharotic to certain of the morbid conditions of the os uteri, Mr. Ellis proposes an improved method of casting the cylindrical pencils of nitrate of silver and a new instrument to facilitate its application. For an account of these we must refer to the paper itself.

Dr. Henry M. Mudge relates a *case of large fibrous tumour impeding delivery.* (pp. 129—133.) The tumour was attached to the external surface of the fundus uteri by a pedicle of an inch in length, which allowed it to drop into the pelvis at or before the commencement of labour. It was six and a half inches in diameter. Six small tumours were scattered over the external surface of the uterus. The large tumour consisted of fibro-cellular tissue of a dusky white colour, with irregular channels, containing a straw-coloured fluid; the whole inclosed in a capsule formed of uterine substance and fibres. The latter were so intimately blended and interlaced with the white tendinous fibres of the interior as to render any attempt at enucleation of very doubtful success, while the large vessels which permeated the pedicle would have rendered excision very dangerous. The tumour was reduced in size by first introducing a trocar in it, and subsequently enlarging the orifice thus made; it was then pushed above the brim of the pelvis, and by the aid of a blunt hook the child, of which the breech presented, was brought down. When born it had some faint signs of life, which soon became extinct. In the latter part of the day after delivery peritonitis set in, which, in seventy-two hours, terminated fatally.

The next paper is entitled "*twin (?) abortion.*" (pp. 133, 134.) Mr. J. C. Langmore exhibited two specimens. The one a fœtus of perhaps some three or four months, which was flattened, and had been dead some time before it was expelled, at the fourth catamenial period, after very slight pain. The placenta was removed three hours afterwards. The hand being introduced to remove clots brought away a second and perfect ovum of about four weeks; its membranes were healthy, and the embryo as seen through them was fresh and vascular. The circumstances of this case seemed to point to the fact of superfœtation having occurred. The specimens were referred for examination to Drs. Harley and Turner, who, in their report, presented at the next meeting of the society, gave it as their opinion that the production of the second ovum of four weeks was in all probability from superfœtation. (pp. 165—169.)

Dr. J. H. Aveling presented his *polyptrite; a new instrument for crushing* the necks of uterine polypi. (p. 135.) The instrument consists of a long hook, a slide, and a screw. The hook is to be first passed over the neck of the polypus; the slide is next to be pushed up as far as it can be made to go by the hand, and then by means of the screw the operation is completed by forcing the blunt blade of the slide into the concavity of the hook and through the neck of the polypus.

Dr. H. Cooper Rose presented a *new description of nipple shield*, and described his *plan of treating sore nipples.* (pp. 135—138.) The body of the shield is of glass, bell shaped, with a pyramidal hollow projection proceeding from its upper part and communicating with its cavity by a contracted perforated stem. Over the latter cone-shaped projection is to be simply tied a calf's teat, a piece of wash leather, or an India-rubber nipple, which when not used should be kept immersed in clean cold water. The advantages of this shield is that the cylindrical portion is sufficiently long to insure a space or vacuum between the end of the mother's nipple when fully drawn out, and the end of the shield. When this part is too short the nipple is drawn up to the top entirely filling it, the lactiferous ducts being, in consequence, blocked against the hard substance of the instrument. The diameter is, also, sufficiently large to prevent strangulation of the nipple. The shield is smooth and unyielding, to avoid friction, and

transparent, allowing the flow of milk to be observed and the position of the nipple ascertained. The substance used for the mouth-piece should resemble as much as possible the parent's nipple, and so arranged that it cannot collapse and allow the child to suck in air.

The plan of Dr. Rose is to direct the use of this shield for the first week or two, or longer if there be a tendency to tender nipples, at the same time he applies to the latter, after each time the child is nursed, a saturated alcoholic solution of gum benzoin and glycerine in equal proportions.

Mr. Henry Grace describes a curious *case of double uterus with simultaneous gestation*, and Dr. Richard Hodges one of *presentation of the right arm and shoulder, delivery by the natural powers, or spontaneous evolution.* (pp. 138—140.)

The history of four additional cases of *ovariotomy* is given by Dr. W. Tyler Smith. The disease of the ovaries was in all cases polycystic. In two of the cases both ovaries were affected, in the other two only one, the left ovary. The results were, in two cases death, in two recovery. (pp. 141—144.)

An interesting case is related by Dr. Wm. Newman, of an *enormous development of hydatids in the omentum, etc., simulating an ovarian tumour.* (pp. 169—173.) The case was one in which an absolutely correct diagnosis was next to impossible during life. The area and character of dulness on percussion, the external appearance of the abdomen, its firm, nodulated character, unaltered by the supine position, the resistance to pressure and the fluctuation presented the same characters precisely as they do in multilocular ovarian disease.

A case in which *air was expelled from the vagina* is related by Dr. George Harley. (pp. 173, 174.) The expulsion of the air was attended with a loud noise. Although odourless, the discharge caused great personal discomfort. It had existed about eighteen months, commencing at a catamenial period, and had recurred at each period to an increased extent. At the date of report there were several expulsions in the course of a few minutes. The patient is married, and the mother of three children. No communication existed between the vagina and rectum. A full-sized male catheter was introduced into the uterus with a long India-rubber tube leading from it and having a stopcock at its lower end, which latter being placed in a tumbler of water, it was found that no air escaped; but when the catheter was introduced no further than the vagina an instantaneous discharge of air took place, and soon afterwards it was found that the water from the tumbler was drawn up through the tube into the vagina. It became evident, therefore, that the vagina in this case drew in the air of the atmosphere and again expelled it by a spasmodic action. In this result the abdominal muscles were found materially to assist. Although the patient could not commence the action, yet, a few minutes after it had begun, she could continue it at will. The uterus was completely retroverted. The posterior lip of the os ulcerated. The patient's general health was not good, she having a careworn and anæmic look. Had suffered from dysentery in India.

The uterus being replaced, and a course of strong nervine tonics entered upon, with astringent vaginal injections, the spasmodic action of the vagina was completely arrested by the end of two or three weeks.

A case of *imperforate rectum, with unsuccessful attempt at relief by operation*, is related by Dr. Wm. T. Fox. (pp. 195—197.) The patient was a male child four days old. Had a small but normal looking anus into which a probe could be introduced, and one-eighth of an inch beyond. A trocar was passed into the anus and carried in the direction of the rectum for about an inch and a half. No good resulted, and the patient soon after died. Upon dissection it was found that the rectum terminated in a cul-de-sac about an inch and a half from the anus, with which it was connected by cellular tissue.

A very interesting case of *rupture of the vagina during labour* is related by Dr. Jno. H. Bell. (pp. 197—202.) The child had escaped into the abdomen, where it remained three and a half hours before it was delivered by turning. The body was born promptly and without difficulty, but before the head came away considerable time and force were required. The placenta was readily delivered by the hand, but whether from the cavity of the uterus or abdomen could

not be ascertained. No untoward or very severe symptoms occurred, and in less than three months from the accident the patient was entirely well.

A very singular case of *unsuspected pregnancy* is related by Dr. Jno. Shortt. (pp. 202—204.) It was the patient's third pregnancy; during the greater part of which she had been treated for obstinate costiveness, and supposed displacement and inflammation of the womb. In the latter period of gestation the intumescence of the abdomen was mistaken for ovarian disease. When the membranes became accidentally ruptured, two days before delivery, it was supposed that an ovarian cyst had given way. When the pains of labour set in a surgeon was called, who pronounced the case to be one of rupture of an ovarian cyst into the abdominal cavity. An opiate draught, etc., was ordered, and the patient placed in a warm bath, when, to the surprise of all parties, a living child escaped into the bath, and would have been drowned but for the presence of mind of an assistant. The child was a boy, at maturity, well proportioned, of average size, but of rather lanky appearance and pigeon-breasted.

The patient, although twice a mother before, appears to have been entirely ignorant throughout of her pregnancy; all her feelings she attributed to disease. The birth of a son was, as she declared, "the greatest surprise she ever experienced." Another remarkable feature in this case was that for almost two-thirds of the period of gestation the speculum, caustic, &c., had been applied to the os uteri, and the most drastic purgatives administered without any injurious effects.

Dr. Thomas H. Tanner comments on *the use of medicated pessaries in the treatment of uterine disease.* (pp. 205—208.) "There are few uterine diseases," he remarks, "in which the use of medicated pessaries may not advantageously form a part of the treatment. But they are more especially valuable in acute and chronic inflammation of the cervix uteri, in internal metritis, with exfoliation of the lining membrane of the uterus, in slight prolapsus or procidentia, in cancer, in all varieties of ovaritis, as well as in many affections of the female bladder. By means of them the diseased parts may be kept constantly bathed in such drugs as mercury, iodine, lead, zinc, belladonna, opium, conium, &c. They are not only most efficacious in relieving pain, but they also shield the diseased and irritable surface from contact with the vaginal walls. Owing to this latter property they are of great utility in healing excoriations about the labia uteri, though, of course, part of the benefit derived from their use in these cases must be attributed to the absorption of the materials composing them. By their employment, moreover, the necessity for frequent examination of the morbid structures is greatly diminished.

Dr. Tanner presents some six formulæ for medicated pessaries adapted to different forms of uterine disease.

A case of *sudden and unconscious delivery* is reported by Dr. Jno. Shortt. (p. 210.) The patient was a Hindoo of caste. Whilst walking with two companions, carrying, all three, loaded baskets on their heads, she suddenly, without any preceding pain or other premonition, felt her child slip between her thighs to the ground; the after-birth came away soon after. The patient was in good health, twenty-eight years old, and the mother of two living children. She knew herself to be pregnant, but did not expect to be confined for some days.

A case of *obstructed labour from the presence of the hymen* in a patient thirty-one years of age is related by Dr. S. Palmer. (pp. 211, 212.) The hymen was of the type of what may be termed fenestrated. That is, having a central band extending from beneath the meatus urinarius to the fourchette, bounded on each side by a perforation or opening. On the left side the margin of the central band was smooth and rounded, while on the right it was fringed. The central band being divided with a pair of scissors, almost immediately after the child's head passed into the world. The scalp was greatly tumefied, and there was a deep sulcus where the band had pressed which did not disappear for ten days.

Case of *acephalo-cyclopean monstrosity.* By Mr. R. Hardey. (pp. 213–21.) The most remarkable features in the case of this monster, was the entire absence of a head, while the rounded and somewhat protuberant termination of the upper portion of the chest presented a face of which the cheeks and mouth were directed upwards. The face was of full size, mouth unusually round, with

a protruding tongue very thick and firm. The cheeks were large, protuberant, and livid—no doubt from long continued pressure during labour. Chin scarcely discernible, but situated at the usual distance from the mouth. Nose entirely wanting. From the centre of the upper lip there ran posteriorly a sulcus, separating the cheeks, and terminating at the central, pointed margin of a rounded cavity, measuring 1⅝ inch from before backwards, and about 1¼ inch across. This cavity, surrounded by a ciliary margin and a few cilia, contained a large globe, possessing *two pupils*, one on each side of the mesial line. The eye itself was protruded forward. The monster was born dead.

Mr. Hardy remarks that his experience, founded upon nearly 6500 cases of labour attended by him during the last forty years, "is in direct opposition to the prevalent opinion that monstrosity in the fœtus is traceable, in a large number of cases, to strong impressions made on the mother's mind during early gestation"—the child when born being marked in the way anticipated by the mother.

The volume contains the history of another *case of monstrosity*, described by Dr. A. Meadows. (pp. 255–59.) The child in this case, which appeared to have arrived at the seventh month, instead of possessing the usual organs of locomotion had at the lower extremity of the body a pointed caudal appendage measuring about 5½ inches from the extremity of the spine.

Dr. A. Hall relates a case of *puerperal convulsions complicated with mania*. (pp. 222–23.) In this case, after apparent recovery, death suddenly ensued.

Dr. J. Braxton Hicks relates five cases of *vaginal closure*. (pp. 228–42.) The first was a case of entire absence of the vaginia (*atresia*) with retained menses, in a girl, 18 years of age: the uterus was punctured through the rectum. The operation was successful: but as there was no menstrual discharge for the ensuing seven months, and for the relief of the intense pain under which the patient suffered, the operation was repeated; after which she menstruated regularly per rectum without pain or inconvenience.

The second case was that of a married woman, 28 years of age. There was complete *atresia of the vagina*. The formation of an artificial vagina was attempted. The patient refused to submit to the completion of the operation.

The third case was one of *excessive dysmenorrhœa from almost complete occlusion of the vagina*, occurring in a married woman, 25 years of age. The occlusion was the result of cicatrices, which were carefully divided by the bistoury, and subsequently a large bougie was introduced into the vagina and constantly worn by the patient. The operation was completely and permanently successful.

The fourth case was one of *almost entire obliteration of the middle third of the vagina*, with conversion of the upper third into a large sac distended with pus. The patient was in the seventh month of her second pregnancy, which occurred seven months after her previous delivery. Pains, at intervals, had set in for three or four days. The vaginia was opened by the knife, and a cavity penetrated, from which were discharged some four or five ounces of pus. The next day but one she gave birth to a dead child. The recovery was complete with patulous vagina, in which a bougie had been constantly worn.

In the fifth case the *middle third of the vagina was contracted to the size of a quill*, in a woman in labour with her second child. The cicatrices in the vagina were divided by the knife. The child being dead, its head, which was firmly impacted in the brim, was perforated, and with much trouble delivered. Recovery was speedy, and two years subsequently the patient was delivered of a dead child, without any trouble.

Dr. Thos. H. Tanner relates a case in which there occurred the somewhat unusual *complication of multiple medullary cancer with pregnancy*. (pp. 243–50.) The patient was about five months advanced in her third pregnancy. Premature delivery was determined upon to increase the woman's comfort, and from the fact that, as the vagina was already nearly blocked up with a cancerous growth, the birth of the child at the full time would be impossible. The fœtus could only be removed piecemeal after being broken up. At the end of some twenty-six days after the operation, the patient died from extreme exhaustion.

The history of this case confirms the general opinion that the existence of cancer does not interfere with a woman's fertility.

Case of *retention of the catamenia* for more than two years, in a married woman; by W. Chapman. (pp. 251–55.) For upwards of two years after having undergone a second operation for vesico-vaginal fistula the patient had not menstruated. At the end of that time she was able to superintend her domestic affairs, to walk out, attend church, and to a casual observer, presented the aspect of health. She complained of great irritability of bladder and stomach, frequent vomiting, and pain in the lower part of back. On examination of the abdomen externally, the existence of a large tumour, resembling the uterus at about the sixth month of pregnancy, was revealed. A vaginal examination showed the cervix uteri to be lost in a general enlargement of the uterus, but no os could be discovered, a thin membrane being detected by the finger in its stead. The speculum showed that the os was hermetically sealed. Soon after the cessation of her menses the patient had suffered more or less distress, which was augmented to severe pain and spasms at every monthly period; on which occasion she had occasionally a copious whitish inoffensive discharge. The diagnosis was retention of catamenia from a closure of the uterine orifice. On this being re-established, by scratching through the membrane existing where its site should have been, until an opening was made large enough to admit the tip of the finger, there was immediately a copious flow of some ten or twelve ounces of a thick fluid of a dark claret colour, and free from all unpleasant odour. Three days after the operation, after improper exertion and exposure, the patient was attacked with severe pain of the abdomen, tympanitis, sickness, small and rapid pulse. A full dose of opium and calomel speedily relieved her, and soon after her bowels were freely opened. In the ensuing week, the discharge from the uterus having become thin and offensive, a full sized elastic male catheter was introduced, through which the uterus was washed out with tepid water, almost daily.

For ten days after the operation the patient seemed to be doing very well. On the eleventh it was ascertained that she had been very sick during the preceding night; could retain no nourishment: her countenance was pale and shrunken, her hands cold and damp. No pulse could be felt at the wrist. Brandy and water was administered. She recognized, and spoke to her friends around her. She continued to sink rapidly, and in a few hours was a corpse. She remained sensible to the last. A post-mortem examination could not be obtained.

In the concluding communication of these transactions, Dr. W. Tilbury Fox discusses the question as to the *influence of the mother's health in the production of rickets* (pp. 260–75).

From the facts adduced by Dr. Fox in the communication before us, there can be little doubt that rickets may be produced in the infant by any marked deterioration of the mother's milk when this is made its sole nourishment. The same would seem to prove also that profuse or regular menstrual discharges taking place during lactation is a prominent cause of an impaired lacteal secretion. But we cannot go so far as Dr. F., and pronounce the occurrence of menstruation during lactation to be the only cause of deterioration in the milk of the mother or nurse, nor do we believe that the facts adduced by him warrant such a conclusion. Nor can we agree with him, as he would seem to teach, that the impaired quality of the breast-milk upon which the sucking infant is exclusively nourished, is the chief if not the only cause of rickets. It is no doubt, in many cases, a very powerful co-operating cause, but facts which cannot be gainsaid seem to prove, incontestably, that among the causes of the rachitic condition, are exposure to a stagnant, impure, raw, damp and cloudy atmosphere, badly ventilated, damp, dark, and unclean dwellings, defective clothing, personal uncleanliness, long-continued quietude in the recumbent posture, want of sufficient and appropriate food, and intemperate and other vicious habits on the part of the mother.

D. F. C.

ART. XXII.—*The Principles and Practice of Ophthalmic Medicine and Surgery.* By T. WHARTON JONES, Professor of Ophthalmic Medicine and Surgery in University College, London, Ophthalmic Surgeon to the Hospital, etc. With one hundred and seventeen Illustrations. Third and Revised American Edition, with Additions from the Second London Edition. Philadelphia: Blanchard & Lea, 1863. 8vo. pp. 455.

WE have always regarded the well-known manual of Mr. Jones as one of the best of the condensed works on ophthalmic medicine and surgery. There is scarcely anything pertaining to this important branch of the healing art which is not touched upon and practically elucidated.

Great advances have been made in ophthalmology within a few years, especially by the Germans; and with characteristic—and it may be commendable—slowness the English are following, and probably will claim originality in most of the procedures that may become *established* facts.

In the body of Mr. Jones' work we find very little regard paid to these "new lights," but the editor "has bestowed much labour in bringing the work up to the present state of knowledge in the department of which it treats." In this effort he has made many valuable additions, nearly all having a practical bearing, such as remarks upon the ophthalmoscope, upon iridectomy in glaucoma, upon strabismus, and particularly upon the surgery of the appendages.

The introduction of the test-type corresponding with *Jaeger's Schriftscalen* is also a good feature, and due notice is taken of American contributions to the science.

As this work professes to be eminently practical, there are some further additions which might be suggested and which may be incorporated in future editions. For example: We find but slight notice of the sulphate of atropia, which is so much more elegant a preparation than the extract of belladonna. In looking over some two hundred pages we found the word atropia only twice. In iritis it is not alluded to at all, the remark "Besides belladonna to oppose the contraction of the pupil," &c., occurring in the article on syphilitic iritis in such a way as not to attract sufficient attention. Now, what is more important to the ophthalmic practitioner than his atropia bottle? Many do and all ought to carry it in their pockets.

We would sooner dispense with mercury than atropia in iritis, and it is certainly invaluable in diagnosis. The only cases in which we have thought that it does temporary harm is precisely where it is often recommended and incautiously used; that is, as an antecedent to ophthalmoscopic examination. If there be no positive reason for using it here, it should not be done, and the most skilful examiners, we believe, profess to reject it altogether for this purpose. We have no doubt that many of the charges at first laid to the ophthalmoscope were due to atropia, on account of serious effects sometimes produced by the great volume of artificial and brilliant light thrown upon the retina through a dilated pupil.

Mention might also have been made of the modification of extraction that has of late been practised; that is, the combination of iridectomy with it in certain cases, and the removal of the lens with the flattened spoon. This instrument is now regarded with great favour by many operators; in fact, we have seen many cases where a large incision and pressure were not applicable, in which, by the use of the spoon the operator was enabled to lift out the hard nucleus of a cataract, through a comparatively small corneal incision, with no injurious disturbance whatever. This spoon can scarcely be called a modification of Daviel's scoop, as it is altogether different in shape and may be applied to different uses.

The Glossary at the end of the book has been revised and enlarged with great care, and is a complete dictionary of the hard terms used in ophthalmic science.

This edition is particularly well printed. The scale of test-type we regard as a model of typographic art. W. H.

ART. XXIII.—*Outline of a New Theory of Muscular Action:* being a Thesis read for the degree of Doctor in Medicine, before the University of Dublin, Dec. 17, 1862. By the Rev. SAMUEL HAUGHTON, M. D., F. R. S., Fellow of Trinity College, Dublin. Williams and Norgate: London, 1863. 8vo. pp. 23.

THE contents of this physiological brochure scarcely warrant its aspiring title. After a careful perusal of its pages, we have been unable to discover that any theory whatever of muscular action is enunciated therein. It consists, on the contrary, of a series of interesting mathematical speculations on the rate of muscular contraction, and the amount of work which the muscles, and especially the heart, are capable of performing in a given time.

It has long been known that muscles in a state of contraction produce sound. In the Croonian lecture, read in 1809 before the Royal Society, Dr. Wollaston endeavoured to show that the greatest frequency of the elementary muscular contraction that produces this sound or susurrus was about 35 or 36 in a second, and the least was as low as 14 or 15. In general, these contractions were between 20 and 30 in a second. Dr. Wolloston thought it possible that the method he employed might be found defective, and expressed the hope that his estimate might be corrected by some means better adapted to the determination of intervals that cannot actually be measured.

Dr. Haughton thinks that an accidental observation made upon himself has enabled him to fix, with the precision desired by Wallaston, the rate of the muscular contraction that causes the susurrus. After recovering from a slight attack of fever, he was occasionally troubled with tinnitus aurium, which was sometimes so great as to prevent sleep. One night, to his surprise, he discovered that the tinnitus was in unison with the susurrus, produced by contraction of the masseter muscles, though differing from the latter by several octaves. The musical note of the susurrus appeared to him to be CCC, or two octaves below bass C; that of the tinnitus coincided with the octave above treble C; or, in other words, it was five octaves above the susurrus, and therefore corresponding to a rate of vibration thirty-two times faster than that of the muscle, or 1024 times in the second.

Dr. Haughton thinks that the tinnitus is altogether independent of muscular or voluntary action of any kind, and is a sign of the rate at which nervous action takes place in the brain.

The rate at which muscular contraction takes place, is between 32 and 36 vibrations per second.

Dr. Haughton found that the supra-spinatus and deltoid muscles were capable, in each of his shoulders, of performing an amount of work equivalent to raising 1083 lbs. through a foot, before they became exhausted. In a friend of his he found that these muscles were capable of exerting a degree of power equal to 1185 foot pounds. Taking the mean of these two observations, he found that the supra-spinati and central portion of the deltoids of both sides are capable of lifting 2268 lbs. through one foot before they become exhausted—that is to say, very nearly one ton lifted through one foot. As the weight of the muscles on both sides, engaged in the act of holding up the arms exactly in the horizontal position, is $10\frac{1}{4}$ oz., or 4485 grains, it follows, by an easy calculation, that 1 lb. weight of the same kind of muscle is capable of lifting 1.56 ton through one foot.

The third part of this little monograph contains some interesting calculations as to the amount of work done by the heart in a day.

"If the heart were an ordinary muscle, it would lift 0.9275 of a ton through a foot in $7\frac{1}{2}$ minutes, and then become incapable of doing more work for some time. As the heart, however, never tires, it accomplishes this amount of work in $7\frac{1}{2}$ minutes, and eight times this work in one hour; therefore in twenty-four hours, the

$$\text{"Work done by heart} = 0.9275 \times 8 \times 24 = 178.09 \text{ ft. tons.}$$

"During each double beat of the heart, reckoned as 10 parts of time, seven

parts are occupied by a muscular contraction of the ventricles or auricles, and three parts are not employed in doing mechanical work. Reducing, therefore, the work just calculated to $\frac{7}{10}$ths of its amount, I find the

"Daily work of the heart=124.6 ft. tons." J. A. M.

ART. XXIV.—*Test-Types for the Determination of the Acuteness of Vision.* By H. SNELLEN, M. D., Surgeon to the Netherlands Ophthalmic Hospital at Utrecht. Printed by P. W. Van de Weijer, Utrecht, 1862. 8vo. pp. 6, with fourteen sheets of tables.

THIS is the fullest and most complete series of test-types for the determination of the degree of vision possessed by patients that we have met with. It comprises letters of the smallest size, or of from only 0.209 Paris lines, to those of 41.886 lines, or of about three and a-half inches. Besides these, we have black letters on a white ground and white letters on a black ground. It contains, also, coloured letters to furnish means of ascertaining the acuteness of vision for the different colours of the spectrum.

Finally horizontal and vertical lines of equal thickness are given, and small black squares to enable us to detect astigmatism. It would have been an additional aid to us in determining this defect had a large circle and also a large square each with thick lines been given. To those affected with astigmatism the circle would appear oval, and the direction in which the circle appeared elongated would assist the optician in arranging the plano-cylindrical lens for the correction of this defect.

These tables are far more extensive than the *Schriftscalen* of Jaeger, and every ophthalmic surgeon and optician should possess a copy of it. They will find it to aid them greatly in their investigations into the acuteness of vision of their clients, and they will also be promoting a benevolent object, as the work is sold for the benefit of the Netherlands Ophthalmic Hospital.

QUARTERLY SUMMARY

OF THE

IMPROVEMENTS AND DISCOVERIES

IN THE

MEDICAL SCIENCES.

ANATOMY AND PHYSIOLOGY.

1. *Sterility in Man.*—Mr. T. B. Curling read a paper on this subject before the Royal Medical and Chirurgical Society (June 23, 1863). The object of the communication was to show that a want of aptitude to impregnate may coexist with the capacity for sexual intercourse, or, in other words, that man is subject to sterility independently of virility. The author states that sterility in man may arise from the following causes: 1. Malposition of the testicles. 2. Obstructions in the excretory ducts of the testicles. 3. Impediments to the escape of the seminal fluid. 1. *Sterility from malposition of the testicles.*—The author remarks that the opinion of John Hunter, "that when one or both testicles remain through life in the belly they are exceedingly imperfect, and probably incapable of performing their natural functions," is corroborated in a remarkable manner by the facts adduced in this paper. After describing the condition of detained testicles, the author states that the question to be considered is, whether a testicle that has not passed into the scrotum can secrete a fertilizing fluid. He assumes, as quite established, that to possess this property the semen must contain zoosperms. Having referred to the observations of Professor Goubaux on horses, and to those of Follin and Godard on man, the author remarks that the proofs adduced by these observers were not sufficiently cogent and numerous to establish the law that cryptorchics are infertile; and it could not be expected that assent should be given to results so remarkable and unexpected without evidence of the most convincing character. Opposite opinions continue to be entertained, and have recently been avowed by Dr. Alfred Taylor. The author gives the particulars of two cases of double detained testicle in married men (cryptorchics) without children; and also two cases of single detained testicle, the second testicle, in one case, being completely atrophied, and in other having been removed by operation. In all four cases the copulative powers were satisfactory; but the ejaculated semen was destitute of spermatozoa. The author gives a table, which includes these four cases and five others, three described by Godard, one by Puech, and one by the President of the Society, making nine in all, in which the fluid ejaculated by men with retained testicles was submitted to examination and found to be destitute of spermatozoa. In confirmation of the results obtained in these cases, he deduces some observations made upon the lower animals by Messrs. Goubaux, Follin, and Godard; and he furnishes a table of eight cases in which the fluid found after death in the substance of a retained testicle—in the epididymis or vas deferens, or in the vesicula seminalis on the side corresponding to the misplaced gland—had been examined and found destitute of spermatozoa. They have not been discovered after death in the spermatic ways of a detained testicle in any one instance that he knows of. The facts which have been brought forward as opposed to the conclusion that cryptorchics are sterile, are chiefly instances in which they are reputed to have pro-

created children. Three cases are cited: one recorded by Mr. Poland, another communicated by Mr. Cock, and a third by Mr. Durham. The author feels no little hesitation in calling in question the claims to paternity in these cases; but remarks that as yet no case has been found in which a retained testicle has been fully proved to be capable of secreting a fertilizing fluid. The observations collected in the paper seem sufficient to show that, as a rule, they do not; and though he sees no valid reason why there should not be exceptions, still the evidence is wanting to establish the exception in either of the instances of reputed paternity which have been mentioned. 2. *Sterility from obstructions in the excretory ducts of the testicle.*—After giving a brief account of Gosselin's researches, in which he showed that after attacks of gonorrhœal epididymitis the channel for the semen is temporarily and sometimes even permanently obstructed, causing, when the epididymitis is double, sterility, the author relates three cases occurring in his own practice of permanent obstruction in the epididymis of both testicles in married men whose wives were barren. In all three the patients had vigorous powers, but there was a total absence of spermatozoa in the ejaculated fluid. The author insists on the importance of careful and prolonged treatment in cases of epididymitis to obtain the removal of inflammatory effusions. The author remarks, that the passage of the semen from the testicle may be prevented by congenital absence of the vas deferens, which, if double, would occasion sterility. A case of the kind, in which the testicles were sound, had been observed by John Hunter. The excretory duct of the testicle is liable also to be interrupted by tubercular deposits in the epididymis. It is well ascertained that this part is much more frequently the seat of tubercle than the body of the gland, and is often extensively diseased, whilst the substance of the testicle remains sound. The author gives a case in point, in which the semen was destitute of spermatozoa. 3. *Sterility from impediments to the escape of the seminal fluid.*—It is well known that a close stricture in the urethra so completely interrupts the passage of the seminal fluid that in ejaculation it regurgitates into the bladder, where it mixes with the urine. In erection of the penis the urethra becomes narrowed, so that a stricture which offers but a slight obstacle to the flow of urine may, under congestion, be sufficient to impede the emission of semen. The author has grounds for concluding that sterility from chronic stricture in the urethra exists to a greater extent than is commonly supposed. As the condition is one which is, in most cases, remediable, it is only necessary to call particular attention to it as not an uncommon source of infertility. The author alludes also to a case in which he had reason to conclude that sterility was consequent upon inflammation and abscesses near the prostate gland, occasioning obliteration of the ejaculatory canals. Two important and delicate questions arise out of these inquiries. 1. Whether a man who has the inclination and power to copulate, but who is nevertheless sterile, is justified in contracting marriage. 2. Whether this condition is a sufficient ground for divorce. That a man who is unable to fulfil the command, "to be fruitful and multiply," is right in disappointing the hopes and periling the happiness and perhaps health of a woman, cannot, the author thinks, be maintained by any casuist, and in some of the cases related in the paper he has felt it his duty to give advice in accordance with this opinion. It cannot be doubted that in women ready for conception, frequent sexual excitement without impregnation is very likely to prove injurious to health, and the author shows from the writings of Dr. West, that diseases of the ovaries and uterus originate from this cause. The second question is one upon which a surgeon is scarcely called upon to pronounce an opinion. But the author ventures to remark that as sterility in women is not considered an adequate cause for divorce, so the man ought not to pay such a penalty for unsuspected unfruitfulness.

The President then related several cases bearing on the paper. A gentleman, aged 34, had been married eight years to a healthy wife. He had strong sexual desire; and frequent intercourse, with abundant emission, but no family. He died of tumour in the groin, which was found after death to have been due to encephaloid disease of a retained testis. The other testis, which was also retained, was of the natural size, but did not contain any spermatozoa. Unfortunately the disease had extended to the bladder, so that the condition of the vesi-

culæ seminales could not be made out. In a second case, not under his (the President's) observation, a gentleman whose testes were retained, and who had frequent intercourse with his wife, ejaculated a transparent fluid, but it did not contain spermatozoa. A gentleman, 34 years of age, whose testes were undescended, had frequent sexual intercourse and free emissions, but the fluid, which was examined four times, did not contain spermatozoa. This gentleman was desirous of knowing if he ought to get married. The President told him that if he did he would have no children. In a fourth case, one testis was misplaced in the perineum, the other was normal. He (the President) tried by an operation to bring it to its natural position, but did not succeed. He subsequently removed it. It did not contain any spermatozoa.

Dr. Webster said the subject discussed by the author of the paper just read was of much interest, and he believed with him that sterility oftener depended upon males than females. In support of such an opinion, he would refer to nearly 300 married men within his own acquaintance who, during their matrimonial state, never begot any offspring, excepting one instance, where a child was born after the mother had remained barren during fifteen years. In the list kept by Dr. Webster no person was entered until the parties had lived together for at least five years; and although he never investigated the matter so scientifically as Mr. Curling, there appeared little doubt the fault mainly depended upon the male, since various females who continued childless throughout their first marriage, on contracting a second became mothers; whereas there only occurred, in reference to the opposite sex, the solitary example already mentioned. It might, however, be added as curious, that a large proportion of the sterile individuals Dr. Webster had thus recorded were Medical Practitioners; and, moreover, what seemed also rather singular, seven of these couples lived in a thoroughfare having the same designation, but with different numbers on their respective residences. Regarding the chief cause of barrenness in the various illustrations to which Dr. Webster referred as coming under his immediate observation, none having been patients, it was impossible to speak definitely; nevertheless, as analogous cases are not uncommon, the inquiry mooted by Mr. Curling was therefore important, both medically and in its social relations, besides bearing specially on questions of jurisprudence.

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2. *On the Amyloid Substance of the Liver.*—One of the most important physiological papers contributed for some time to the Royal Society is one written upon the above subject by Dr. R. McDonnell (Dublin). We think it necessary also to give a slight sketch of one by the same author, to which the present one is a sequence. The first paper[1] was read before the Royal Irish Academy, 1860.

The amyloid substance was described in 1857 by Professor Bernard, before the Académie des Sciences, under the name of glucogenic matter. Hensen also, independently of Bernard, discovered this substance. Bernard's view of this compound was, that the liver only formed it with the object of its ultimate transformation into sugar. Hence, he named it glucogenic matter. The following were the questions open to investigation at the time that Dr. McDonnell wrote his first paper:—

1. Has the liver the power of forming the amyloid substance from azotized compounds?

2. Is the liver endowed with the function of converting it into sugar during life and health?

3. Has the liver the exclusive privilege of forming it, or is it met with in other tissues and organs?

The amyloid substance of Bernard is a compound isomeric with dried grape sugar. It is neutral, whitish, inodorous, insipid, soluble in water, insoluble in alcohol and strong acetic acid. In the presence of saliva or other animal ferments it is converted into sugar. Iodine in contact with it produces a peculiar brown colour, disappearing on the application of heat, and reappearing when the fluid cools to 80°. This reaction is very beautiful and decided.

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[1] For a notice of this paper see this Journal for Jan. 1862, p. 214.

Dr. Mc Donnell objects to M. Bernard's process for preparing this substance, as he states that the product is likely to be contaminated with gelatine and casein. The author proposes the following process as more likely to yield a pure product: The tissue while still raw is pounded in a mortar with animal charcoal, boiled with a small quantity of distilled water, and the whole thrown upon a filter. The filtrate is then allowed to drop into glacial acetic acid. The amyloid substance being insoluble in that menstruum, falls as an abundant white precipitate. The first query propounded, viz: "Has the liver the power of forming the amyloid substance from azotized compounds? is treated in the following manner: In his experiments, the author found that bitches and cats, fed exclusively upon meat, continued to form milk containing sugar. It is argued, nevertheless, that the amylaceous and saccharine matters enter from without, *i. e.*, that the herbivora find the amylaceous principle in vegetables, that accumulates in *their* tissues, and through this channel enters the organism of the carnivora." Dr. McDonnell argues that such is not the case, because mutton or beef does not give any precipitate of the amyloid substance when treated by the acetic acid process. In answer to the two last questions the author replies in the negative.

"It seems to me that the amyloid substance is on its way to a more exalted or complex immediate animal principle, and that its conversion into sugar is a deviation from its progressive course."

After detailing some experiments which warrant this assumption, he goes on to say:—

"Hence one seems, in some degree, justified in concluding, that in vegetable-eating animals the blood is normally saccharine, but the liver does not appear during life to form and pour out into the blood of the hepatic vessels, sugar specially derived from the transformation of the amyloid substance into that material.

"The existence of the amyloid substance in other organs and tissues is rendered evident by the following facts:—

"The amyloid substance is abundant in the liver, &c. It is found in the placenta most plentiful about the third and fourth months of utero-gestation. It exists in the lungs and muscles of the fœtus, as well as in the epithelial cells of the skin, respiratory and digestive organs, amounting sometimes to fifty per cent. It exists in the cartilage of the embryo of the chick. It is met with in muscles paralyzed in consequence of section of their motor nerves."

The author having arrived, by a repetition of Dr. Pavay's ingenious experiments, at the conclusion that the amyloid substance of the liver is not normally changed into glucose, the following question presents itself: May it not be that the liver does for the adult what divers tissues do during the development of the fœtus? *id est*, may not the liver form, with the help of the amyloid substance secreted in its cells, a nitrogenous compound, just as the muscle of the fœtus converts the amyloid substance contained in them into the highly nitrogeneous material of muscular tissue? For Dr. McDonnell's remarks, in a previous part of his paper, that the presence of the animal dextrine, in placentæ of rabbits, &c., and also in amnion, as noticed by Bernard and others, is quite a secondary matter, to the fact that he has demonstrated, which is, that this animal dextrine enters largely into the constitution of most of the tissues of the embryo. During embryonic life a great part of the fœtal tissues are found to be so impregnated with the amyloid substance, that it appears to be the formative material from which these tissues are evolved. Therefore, to sum up in the words of the author, the ultimate destination of the amyloid substance in the animal economy, seems to be to take to itself nitrogen, it being itself a protoplasma, which, by becoming azotized, terminates in the evolution of fully-formed nitrogeneous tissues. It is on its way upwards, towards the more exalted or complex immediate animal principles; in fact, the process of healthy assimilation tends, if the expression may be used, to promote it from the rank of ternary (non-azotized) to that of quaternary (azotized) compounds, and that its conversion into sugar is to be looked upon as a deviation from its progressive course—a dissimilative instead of an assimilative process.—*Dublin Med. Press*, Aug. 26, 1863.

3. *Fibrine, and the Causes of its Coagulation.*—Schmidt's very interesting researches show that it is principally the cells which contain the active principle in the process of coagulation. Lymph and chyle do not possess the property of spontaneous coagulation before their admixture with cells, which takes place in the lymphatic glands. But if cells are artificially added to pure lymph and chyle, coagulation begins at once. The difference in the appearance of fibrinous coagula was found to depend, not on a variety of fibrinous substances, but on the difference of the cells which produce the coagulation. Serous effusions coagulated when to their clear fluid a small quantity of defibrinated blood was added. The action of the active principle is not analogous to that of ferments, for it is used up in the process. It combines chemically with the coagulable substance. Schmidt calls those substances which have the power of inducing certain albuminous fluids to coagulate, *fibrinoplastic*. Among these are especially blood-lymph, chyle, and pus-corpuscles; but also the cornea, the watery extract of the crystalline lens, the humours of the eye, saliva, &c. The fluids which contain the coagulable principle in solution he names *fibrinogenous*. The fibrinoplastic properties he further shows to depend on a substance which is identical with hæmato-globuline. As regards the influence which the gases of the blood exert upon its coagulation, he makes out that the presence of carbonic acid always retarded coagulation. This retarding influence is but very slight when exerted on fresh blood. He thinks that the differences in time which arterial and venous blood show in reference to coagulation may be accounted for by the different amounts of carbonic acid which they respectively contain. Oxygen and atmospheric air he found to have no direct influence in promoting coagulation; but when much carbonic acid is contained in the blood, oxygen promotes coagulation by displacing that gas. Blood which in vacuo had been freed of all its gases did not lose its fibrinoplastic power. Contact with animal tissues retards coagulation.—*Brit. and For. Chir. Rev.*, July, 1863, from *Archiv für Anat. Phys., &c.*, 1861.

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4. *Effects of Suppressed Action of Skin.*—Edenhuizen has performed some experiments on rabbits, sheep, a dog, and other animals, for the purpose of ascertaining what changes take place in the organism when the action of the skin is suppressed. When one-eighth to one-sixth of the skin of an animal was covered with glue, oil-colour, varnish, gum, tar, &c., it was sure to die of the effects. Edenhuizen concludes from his researches that in the healthy state a small quantity of nitrogen in a gaseous form is given off by the skin, and that, this function being suppressed, the nitrogen is retained in the blood in the form of ammonia, which is then deposited as triple-phosphate in the subcutaneous areolar tissue and in the peritoneum. The nitrogenous compound retained in the blood acts as an irritant to the nervous system, producing rigors, palsies, cramps, and tetanic attacks.—*Ibid.*

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5. *New Source of Oxygen for the Animal Organism.*—At a recent meeting of the Munich Academy of Sciences, Baron Liebig announced what he considered as a very important discovery. The atmospheric air has hitherto been regarded as the chief or only source of the oxygen employed in the processes of nutrition and metamorphosis within the animal organism. By the aid of an apparatus, for which King Max provided 7000 florins from his private purse, it has now been shown that, within the bodies of carnivora, a very considerable amount of oxygen is produced from water; and that, under given circumstances, a powerful process of decomposition is set up, resolving the water into its constituent parts, its oxygen serving for the formation of carbonic acid, and the hydrogen (which often exceeds the volume of the animal in quantity) being discharged by expiration.—*Med. Times.*

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6. *Effects of Compressed Air on the Animal Economy.*—During the building of the new bridge at Kehl, the labourers had to work in compressed air. Bucquoy made observations of the effects of that air upon himself and others. He found that, in getting into the reservoir, the respiration lost its regularity. Restlessness was soon felt, and pain in the ears set in. It was as if a foreign body was

driven with force into the external meatus. This pain was so intense that some people could not help crying. After a while it went off, then came back again, till it at last entirely ceased. The breathing grew also quiet; the inspiration was shorter than usual; the expiration longer; the pulse was more frequent than normal; hearing was impaired, and it felt as if an expanding body was lodged in the interior of the ear. The voice sounded as if it came through the nose, and it required an effort to speak out. At 2½ atmospheric pressure it was impossible to whistle, and there was much perspiration. On returning into the open air, the breath formed a cloud; there was a sharp feeling of cold; the pain in the ears returned; there was palpitation of the heart; and the respiration got again irregular. On analyzing the air, it was found to contain 2.37 per cent. of carbonic acid; the remainder consisted of 19.23 per cent. of oxygen, and 80.77 per cent. of nitrogen. Those who had to work for a long time in the compressed air became emaciated. Many labourers lost their appetite, and looked as if they were just recovering from a severe illness. Muscular and rheumatic pains often occurred, and sometimes the effects of congestion of the lungs and of the brain were observed. The blood which was taken from veins presented, in some instances, a bright red colour; and this was especially the case when the person had remained long in the condensed atmosphere. The movements of the limbs appeared to be more easy than in the normal air.—*Brit. and For. Med.-Chir. Rev.*, July, 1863.

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7. *On the Filtration of Air, in reference to Putrefaction, Fermentation, and Crystallization.*—The following are the final conclusions of SCHRÖDER on this subject:—

1. All vegetable or animal forms derive their origin from other living vegetable or animal beings. *Omne vivum ex vivo.*

2. When a series of specific products of fermentation and putrefaction is developed at a certain spot, germs which originate the process have been conveyed to that spot through the medium of the air. Such is certainly always the case with regard to germs of mould, and to the ferments of wine, milk, and urine.

3. Vegetable and animal matter, in which all germs have been destroyed by boiling, and which, while still in a hot state, has been shut off from the direct influence of the external air by means of cotton-wool, remains perfectly free from mould, fermentation, or putrefaction. The germs, which otherwise would be supplied by the air, are arrested in the passage of the latter through the cotton-wool.

4. The germs of most vegetable and animal substances are destroyed by exposure for a short time to a temperature of 100° C.

5. But milk, yelk, and meat contain germs which are not thus killed. Boiling at a higher temperature under higher pressure, or long-continued boiling at 100° C., will, however, always suffice to destroy these germs also.

6. The germs in milk, yelk of egg, and meat, after having been boiled a short time, are still capable of being developed into the specific ferment of putrefaction, and sometimes also—those of yelk, at least—into long and indolent vibriones.

7. The specific ferment of putrefaction is of an animal nature. It develops itself and multiplies at the expense of albuminous compounds, but does not multiply under those conditions alone which supply all the requisites for vegetable growth.—*Sydenham Society's Year Book* for 1862, from *Annal. der Chem. u. Pharm.*, vol. 117.

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8. *Error of supposing the Flexor Longus Pollicis Pedis Muscle of Man as, normally, a Flexor of the Great Toe only.*—Dr. JOHN STRUTHERS exhibited to the Medico-Chirurgical Society of Edinburgh a dissection showing the tendon from the flexor longus pollicis to the second toe to be larger than usual. Dr. S. remarked that this variety was one of degree only. The tendinous slip commonly described as connecting the tendon to that of the flexor longus digitorum was nothing less than a tendon from the so-called flexor longus pollicis to at least the second toe as well, constituting the latter, so far, a second flexor communis

Normally, the tendon to the second toe was from one-fourth to one-third of the size—sometimes more, sometimes less—of the tendon to the great toe, and therefore of nearly full proportionate size, when the relative magnitude and strength of the two toes were considered. It was larger than, and might be twice as large as, the tendon which the second toe received from the flexor longus digitorum, underneath which (as the sole lay in dissection) it passed before the two united, and the first lumbricalis muscle arose from it more than from the tendon of the flexor longus digitorum. By its connection with the expansion formed by the flexor longus digitorum, or rather with that of the flexor accessorius, it was enabled to act, though less directly, on the other toes, at least on the third. The flexor longus digitorum sometimes also gave, in exchange, a slip to the flexor pollicis, but this is a variety.

The occurrence of a tendon from the flexor longus pollicis to the second toe had been looked on by some as a variety, and as then establishing a significant correspondence to the condition in some of the quadrumana. The true zoological affinity was, however, best indicated by considering that, in ordinary five-toed quadrupeds, the five toes were supplied by a common muscle, that in the quadrumana there was either the same, or two common flexors variously disposed, or a connection between the two muscles, while, in man, the corresponding condition remained in the foot, but disappeared in the hand by the complete differentiation of the flexor longus pollicis from the flexor profundus digitorum. The enormous development of the hallux, required for the erect posture, with the corresponding development of its long tendon, threw the other tendon relatively into the shade; but the connection was not severed, as the hallux was not used as an independent digit, as the pollex of the hand was. What was remarkable in man, therefore, was not the presence of an association between the tendon of the pollex of the foot with the tendons of the other digits, but the absence of it in the hand.—*Edinburgh Medical Journal*, July, 1863.

MATERIA MEDICA AND PHARMACY.

9. *Gluten in Crust of Bread.*—M. Barral has presented to the Academy of Sciences some remarks of much interest concerning the crust of bread and the gluten contained in it. He had recently shown that, when equally dried, the crust of bread is more highly azotized than the crumb; and he also showed that the crust was more soluble than the crumb in water. M. Payen had, it is true previously pointed out this greater solubility of the crust, and had ascribed it to the conversion of the starch into dextrine during the baking. But M. Barral's experiments show another important fact. "If," he says, "we exhaust with water an equal quanity of dry crust and dry crumb of bread, we find that the soluble portion of the crust consists of from seven to eight per cent. of nitrogen, whilst the soluble portion of the crumb contains only from two to three per cent. The greater solubility of the crust consequently, depends upon the transformation which its gluten has undergone under the direct action of the 200° to 220° heat of the oven. The soluble portion of the crust is more highly azotized than the juice of meat." M. Barral added, that he was still engaged with his experiments, which would throw some new light on panification.

10. *Combination of Protiodide of Iron and Manna.*—The protiodide of iron, in the form of pills, is very commonly employed in France, and the preparation generally contains the protiodide with a certain proportion of honey powdered liquorice, and powdered mallow. M. Foucher recommends a kind of sugar-plum (*dragée*), composed of protiodide of iron, purified manna in tears, and powdered liquorice and mallow. By the union of these substances, M. Foucher obtains a mass in which the combination of manna with the protiodide preserves the latter from any alteration, and it forms a true paste which, when divided into pills or *dragées*, softens by the heat of the hand. Each *dragée* broken

into pieces presents internally the greenish colour characteristic of the well-prepared and well-preserved protosalt of iron. In this preparation, therefore, there are two essential conditions observed—namely, the preservation of the salt without chemical alteration, and its easy solubility in the digestive passages. But M. Foucher also believes that the manna, by its laxative operation and its stimulating the secretions of the digestive canal, would also act both in facilitating the absorption of the drug and preventing the tendency to constipation which is one of the most troublesome effects of the ferruginous preparations.—*Brit. and For. Med.-Chir. Rev.*, July, 1863, from *L'Union Médicale*, April 7, 1863.

11. *Liquid Permanganate of Potash.*—M. LECONTE prepares this solution in the following manner: Caustic potash, six drachms; chlorate of potash, five drachms; binoxide of manganese, five drachms. Dissolve the caustic potash and the chlorate in a small quantity of water, and add the manganese; get rid of the water by evaporation, stirring constantly, and calcine the dry mass to a dark red for an hour in an untinned iron cup; allow to cool, and add a quart of plain water. Then boil for five minutes in a china capsule, and you will obtain a fluid of a slightly purplish tint; decant the solution, and wash the residue with such a quantity of water as to make altogether two quarts. When filtering is thought necessary, the liquid should be passed, not through paper, but through very fine sand. For dressing foul wounds, or for injecting, use one drachm of this solution to from three drachms to five of spring water.—*Lancet*, Aug. 22, 1863.

MEDICAL PATHOLOGY AND THERAPEUTICS, AND PRACTICAL MEDICINE.

12. *Epidemic Angina Pectoris.* By M. GÉLINEAU.—This epidemic, which seems to be not unlike one which was described by Dr. Von Kleefeld as occurring at Dantzig in 1824, prevailed on board the *Embuscade*, a corvette in the French Imperial navy, in 1858. The crew of this vessel numbered 250 men and boys. For some months this crew had been exposed to considerable alternations of climate, in consequence of the corvette being constantly on the move between stations on the Mexican, the Chilian, and the California coast; and besides this, there was reason to believe that not a few of the number were abandoned to various most demoralizing practices. The epidemic angina pectoris, which broke out in the neighborhood of St. Helena, after some days of very stormy weather, was preceded by a few isolated cases of the same disorder, and of colic, neuralgia, and scurvy. On the 13th of March, an old sailor, who was both scorbutic and anæmic, was attacked while climbing the mast; five days later three others were attacked in the same manner; and between the 18th and the 23d two others. The corvette remained at St. Helena ten days, and during this time the health of the men improved and there were no fresh cases of angina pectoris; but as soon as the vessel got out to sea again—as soon, almost, as the voyage was resumed—six new cases broke out, in persons all of whom were very decidedly scorbutic. M. Gélineau, after detailing the individual cases, gives the following general description of the disorder. The pain begins invariably at the sternum, and is acute in proportion to its vicinity to the heart. It is behind and to the left of the sternum, generally. In one instance it began at the basis of the thorax, in another over the musculus rectus, in a third in the right hypogastrium; in all cases it shot in unbearable pangs towards the heart, and usually these pangs were accompanied by a distinct dread of death. In the majority there was, in addition, a pain in the left shoulder. The patients sought relief by drawing deep breaths, and by bending towards the left side. The pulse generally was retarded and small, and not unfrequently this condition of the pulse was accompanied by palpitation and violent action of the heart, as judged by the strong impulse of the apex of

the organ against the side. During the attack the patient dared not venture to speak, and for some time afterwards his words were scarcely audible and the fewest possible. Eructation, with a feeling of relief, followed the attack in eight cases; vomiting, without much relief, in three or four instances. Once the attack was followed by retention of urine. No attack happened during the night, and the most common time during the day was during the afternoon *siesta*. After awhile any effort, or the act of eating, was a sufficient exciting cause. The treatment consisted in the application of dry cupping glasses with various anæsthetic applications externally, and with narcotics internally.—*Ranking's Abstract*, vol. xxxvii., from *Gazette des Hôpitaux*, Nos. 114, 117, 120, 1862.

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13. *Pseudo-gangrenous Bronchitis.*—A man, aged 40, a paper-maker, of good constitution and habitually enjoying excellent health, was seized early in April with cough and abundant expectoration of matter having a fetid odour. These symptoms appeared when he was apparently in the best health, and were unattended by any constitutional disturbance. The patient ate and worked as usual; he was troubled only by the frequency of the cough, by the abundance of the expectoration, and by the daily increasing fetidity of his breath. His fellow-workmen complained of the odour, and this symptom became so unbearable that he was obliged to enter the Hospital de la Pitié, under the care of M. Empis.

On admission, his breath, especially when he coughed, was extremely offensive. His sputa consisted of glairy transparent colourless matter, very frothy on the surface, holding in suspension a number of small unequal masses of opaque mucus, which floated free in the colourless portion of the sputa: the whole sputa had a peculiar very disagreeable odour, resembling that of gangrene of the lung. On pouring the sputa into a basin of clear water and stirring the mixture, the opaque masses did not communicate to the water the least muddy tint, as purulent sputa do.

The conformation of the patient's chest presented nothing remarkable; percussion elicited a normal clear sound in all points of the lung; on auscultation, there were heard behind, over a space 6 or 7 *centimètres* in diameter below the angle of the right scapula, some moist mucous *râles*, with unequal bubbles, which were partly displaced by coughing. There did not appear to be any pathological modification of the voice.

The patient felt no oppression, and could make large and deep inspirations without the least pain. His sleep was often interrupted by the cough and by desire to expectorate. He was not able to lie on the left side, from a feeling of suffocation when he did so. He had a good appetite; ate and digested well; and had never had fever.

In a clinical lecture on the case, M. Empis remarked that the fetidity of the breath and sputa gave at first the idea of pulmonary gangrene. But the sudden manner in which the expectoration was produced, without having been preceded by any symptoms of disease, and the general state of the patient, so little in harmony with the severity of the general symptoms ordinarily met with in patients affected with gangrene of the lung, forbade the idea of this condition to be entertained. Gangrenous fetidity of the breath and expectoration does not belong exclusively to pulmonary gangrene, and may be met with in certain diseases of the bronchi independent of true gangrene. Laennec more than suspected this, when, failing to find the pathological characters of pulmonary gangrene in patients who had had fetid bronchorrhœa, he suggested that the fetidity of the expectoration depended on a general disposition to gangrene, which excited the mucous secretion of the bronchi. Since that time, M. Briquet has pointed out that, in addition to pulmonary gangrene properly so called, there is an affection of the bronchi which resembles true pulmonary gangrene in the special fetidity of the breath and sputa, but which differs from it in its symptoms, in its pathological anatomy, progress, and frequently favourable termination. M. Lasègue has called this condition *curable* gangrene.

The quantity of the expectorated matter varies much. In the present case,

it was about a quart daily: but frequently it amounts to several quarts in twenty-four hours. In cases of long standing it contains, in addition to the elements already described, a grayish finely granular matter, not at all viscous, which is deposited at the bottom of the vessel. It is partially miscible with water, to which, when beaten up in it, it communicates a more or less muddy tint. The fetidity of the breath varies in degree; on some days it is slight, while on others it is very intense; it may disappear in favourable cases, with the catarrhal secretion with which it is connected. The expectoration is not unfrequently preceded by the formation of vomicæ, which burst in coughing, and discharge their contents.

In most cases, there are no remarkable physical signs; there may be no general symptoms, or there may be slight febrile reaction; but in no case is the disease attended with the severe symptoms which ordinarily accompany gangrene. When death occurs, it takes place as the result of exhaustion produced by the excessive secretion, unless the patient be carried off rapidly by some acute complication, such as pneumonia or erysipelas.

The pathology of the diseases does not appear to be positively determined.

M. Briquet believed that the extremities of the bronchial tubes become dilated, and affected with gangrene independently of the other parts of the lung. M. Empis criticizes the latter notion at some length, and says that it seems to him more rational to admit that the disease consists in a special pathological alteration of the mucous membrane of the bronchi, in virtue of which they become dilated, while at the same time their internal surface secretes a prodigious quantity of fetid matter. The disease then may be theoretically resolved into dilatation of the bronchi; bronchorrhœa; and gangrenous fetor. But these are neither successive nor subordinate one to another; they advance equally, and it is their union and indivisibility which constitute the special character of the disease.—*British Med. Jl.*, Aug. 1, 1863, from *Gaz. des Hôp.*, June 2, 1863.

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14. *Infantile Paralysis.*—Mr. HOLMES COOTE has published (*Lancet*, July 11, 1863) some very interesting remarks on this affection. He limits the term "infantile paralysis" to one of the effects produced by the functional disturbance of the nervous centres. The absence of any recognized morbid change of structure in those cases, where post-mortem examination has been made, is rather owing to over defective means of observation than from no such morbid change existing.

The most common exciting cause of this affection, Mr. C. thinks, "is the irritation of first dentition; but I have known the same effect to be produced by the second dentition, and have witnessed symptoms of analogous character, though not so strongly marked, in the adult. A young lady, twenty-two years of age, whose teeth were crowded together and partly decayed, experienced occasional attacks of numbness and loss of power in one upper extremity, recurring at intervals, until she had been relieved by an experienced dentist of the stumps of a number of decayed teeth, which had been the source of pain. But the attack may be quite sudden, without any recognized premonitory symptom. Thus an infant at the breast will appear to have momentary faintness, or may be taken up by the nurse as usual after an apparently uninterrupted night's rest, and in both instances the limbs may be found paralyzed.

"On May 7th, 1863, I saw a boy, aged eight, at the Orthopædic Hospital, in whom the left lower extremity was smaller in circumference, shorter, and colder than the opposite, the foot being in the position known as equino-varus. His mother gave the following history: At two years of age, when to all appearance well, he suddenly fell down stairs from a landing whereon he was playing. When taken up, it was found that the limb had lost all power, and he has never walked since.

"On the same day I saw another boy, Henry M——, aged four, suffering from talipes equino-valgus of the left limb. The mother said that the child began to walk when about twelve months old. He was then, to use her own words, 'taken off his feet' by vomiting and purging. For two years he was quite unable to walk. He was galvanized at another hospital, but without avail.

After a time he became stronger in the back, and could sit up; finally he recovered the use of all the limbs, except the left lower extremity, which has continued weak, cold, and deformed. The limb is smaller than the opposite in circumference by a quarter of an inch, and shorter by half an inch.

"The same effects have been referred to the influence of eruptive disorders on the frame. On May 18th, 1863, I saw a boy, named Richard G——, aged six, suffering from talipes equinus. The mother said that six weeks after having had the measles he went to bed as usual. The next morning she found the right leg completely paralyzed. After a time some power returned in the muscles of the calf, and the heel was drawn upwards. The limb was smaller in circumference, but not materially shorter.

"I do not believe that 'talipes equinus' is ever congenital as a deformity. Now, there are two classes of cases, which, though allied as indicating disturbance of the nervous centres, and in both instances followed by contractions of the limbs, are yet separated by important points of difference. In the first, the limbs are spasmodically contracted, the thighs and legs bent, the heel raised, and the movements are irregular, but there is neither atrophy of the limb nor diminution of temperature. In the second, the heel may be raised or the foot otherwise turned; but the limb is shorter, smaller, colder, and wasted. In the first, the muscular degeneration and conversion into fat is a slow process, extending over many years. In the second it is rapid, the growth and development of the limb being arrested from every moment of the stroke. I believe the first to be an instance of disturbance of the control of the will over muscular power from *cerebral* irritation, such as would be excited by the deposit of tuberculous matter in the membranes about the cerebellum; the second to be an instance of lesion of the *spinal cord*. And although no very clear line of demarcation can in all cases be drawn between the two, yet we find that in the first class of cases the patients are often morbidly excitable, irritable, and prone to laugh or cry; while in the second class, after the first symptoms have subsided, the functions of the brain do not seem to be affected.

"I fancy that in these cases of cerebral disturbance there is often a congenital defect, the development of the brain and the manifestation of the intellect being imperfect. I am now attending the daughter of a lady, whose case illustrates this point. The child is about ten years of age, and she was put under my care in consequence of her ungainly walk, the knees being slightly bent, and the feet having an inclination inwards. I found that the muscles of the calf were so much contracted that the foot was held at right angles to the leg, and the heels came with difficulty to the ground. The control of the will over the muscles generally was imperfect. The child could learn a short lesson, but was not studious; was subject to violent fits of temper, and never had shown affection for any about her. The general aspect was such as warranted a prediction that these peculiarities might become stronger with age.

"The ultimate effects of infantile paralysis, dependent on lesion of the spinal cord, as it affects the limbs, are as follows:—

"In by far the greater number of cases the loss of power is in the lower limbs. At the commencement the paralysis may be general and complete, but usually all the limbs save one recover as mysteriously as they were attacked. Neither sex nor side of the body seems to exercise any influence. Boys and girls, right and left side of the body, suffer equally. But the paralysis is rarely complete: the foot rarely hangs powerless; usually the muscles of the calf retain some power, and pull up the heel (talipes equinus paralyticus); or the foot may incline inwards (talipes equino-varus); or the muscles of the calf and the peronei may pull it outwards (talipes equino-valgus); or, finally the anterior tibial muscles may overcome the paralyzed muscles of the calf, producing talipes calcaneus.

"As patients grow up, the great annoyance which they experience is the liability to sprains. All the ligaments are weak and elongated; and if a person so afflicted tread on a stone or any rough body, he gives the limb a twist which lays him up for days.

"The affection may be limited to an upper extremity, in which case, usually, the deltoid muscle becomes paralyzed, and the humerus drops from the socket;

or, in rarer instances, the muscles of the upper arm become wasted, the forearm being well formed as usual.

"There are cases in which the affection comes on slowly and progressively; others in which first one limb and then another is attacked, but these are comparatively rare. I saw a boy, aged sixteen months, in whom the right heel had been drawn up when the child was five months old. That attack passed away; at the present time (May 18th, 1863) the left heel is contracted.

"In all these cases, the treatment consists in an attempt to remove the source of irritation, whether it be seated in the brain or spinal cord, or whether there be any amount of reflex irritation. As a general rule tonics are not indicated; but purgatives and small doses of tartar emetic often relieve symptoms. The temperature of the limb must in all cases be carefully maintained; and when, finally, the contraction has become permanent, the proper tendons should be divided, and elongated by subcutaneous tenotomy and extension, the foot being held in proper position by the aid of irons. The details of the treatment would lead me into particulars which are already well known to the profession, and which require modification according to the nature of the case."

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15. *Cirrhosis of the Liver in a Child five years old.*—Dr. DAVID MURRAY, Resident Surgeon Royal Maternity Hospital, Edinburgh, reports (*Lancet*, Aug. 22) the following case of this: M. C., aged five years, came under Dr. M.'s care about three weeks before her death, complaining of severe pains in the abdomen, with bearing down, and passage of blood. On investigating her history, it was found that up to three years of age she had always been a very healthy child, when at this time she began to experience transitory pains in the abdomen, more especially in the hepatic region. At times these were so severe that the child could not tolerate them, and, though naturally patient, she screamed in agony. Soon afterwards she began to be affected with a sensation of bearing down, which caused her to go to stool very frequently. Her constitution began to give way, and from being strong and healthy she became pale and anæmic. The mother stated that she applied to several medical men, without, however, deriving any good. At this time no suspicion was entertained regarding the nature of the case. She continued in this chronic condition of ill-health, having the bearing-down sensation and pain generally diffused over the abdomen, when the mother's attention was attracted by the child's passing blood at stool. She was then placed under Dr. Murray's care. On examination, the abdomen was found to be very much distended, but no fluctuation could be detected. The liver was hard and nodulated to the touch, and when pressed upon the child cried out; the feeling was exactly similar to that presented by a cirrhosed liver. To relieve the pain, warm fomentations were applied over the abdomen, and a few doses of Dover's powder given, which had the desired effect. About a fortnight after she was first seen the patient was attacked with severe hæmatemesis, when she vomited several pints of dark venous-looking clotted blood. A few doses of gallic acid, with cold cloths, and rest in the recumbent posture, were ordered, which for the time had the effect of stopping the hemorrhage; but a few hours afterwards a second attack supervened, which resulted in the death of the child.

As a wish was expressed to have a post-mortem examination, the mother willingly complied with it. On making an incision through the abdominal parietes, the first object which presented itself was the liver, which was covered with nodules varying in size from a hazel-nut to a hen's egg. The parenchyma presented everywhere a granular character, and of a dense, firm, leathery consistence. The granulations varied in size from a pin's head to a linseed, and were separated by corresponding areolar tissue. The intestines were universally covered with ecchymosed spots, and from the rectum upwards were filled with masses and clots of dark venous-looking blood. The stomach also was packed full of clots. The whole surface of the mucous membrane, from the stomach downwards, was carefully washed and examined, but no lesion of any kind could be detected; thus proving that the blood was entirely passive in its origin, arising from the obstruction to the passage of the blood through the

portal vein. The spleen was greatly enlarged and much congested. No examination was made of the head.

Here was a case of distinct cirrhosis of the liver in a child only five years of age, which was not congenital, for she enjoyed good health till she was three years old, nor could any particular cause be assigned for it. The child herself had a peculiar repugnance to alcoholic stimulants of every kind. With regard to the parents themselves, they certainly were very intemperate in their habits. The records of children's complaints do not present a similar case in so young an individual.

16. *Vaccination of Young Children.*—The following report by Dr. DAVID MURRAY, on the results of vaccinations at the Maternity Hospital, was read before the Obstetrical Society of Edinburgh: "I have myself vaccinated altogether about twenty-five cases, a few of them being done by others, at my request, out of doors. The following exhibits the respective ages of the patients: Five at 1 day old; six at 2 days; three at 3 days; four at 5 days; four at 6 days; three at 7 days. In every case the vaccination was perfectly successful, and seemed to take very readily—the amount of lymph in some instances being almost imperceptibly small. The vaccine vesicles went through their course successfully in the usual time, and were very complete and well formed. No injurious effects were observable; the children took the breast, and appeared as if nothing unusual had been done to them. No child of even three months could have been less disturbed.

"If dangerous results had been likely to have followed the performance of the operation, I believe that it would have been so in the present instances, as it is well known that many of the children born in the Maternity Hospital are very unfavourably situated, having by no means good constitutions transmitted to them. Though, therefore, the number is comparatively small from which to form an extensive induction, yet I consider that the present results sufficiently entitle us to draw the following conclusions:—

"1. That no danger attends vaccination at even the earliest period of existence. and that, therefore, it may be done with perfect impunity.

"2. That the vaccine lymph seems to affect children as readily, if not more so, at that early period than at a more advanced age.

"3. That most of the dangers or bad effects which are said to have followed the employment of early vaccination cannot fairly be attributed to any constitutional disturbance occasioned by the operation, but must have arisen altogether independent of it."

The following report by Dr. RITCHIE was also read: "1. Mrs. F.'s boy, 12 hours after birth—successful. 2. Mrs. C.'s boy, 10 hours after birth—successful. 3. Mrs. M.'s boy, 62 hours after birth—successful. 4. Mrs. B.'s boy, 5 hours after birth—successful. 5. Mrs. B.'s child, 5 days after birth—successful. 6. Mrs. M'K.'s child, 4 days after birth—successful. 7. Mrs. M'L.'s boy, 3 days after birth—unsuccessful."—*Edinburgh Medical Journal*, July, 1863.

17. *Treatment of Malarious Fever by the Subcutaneous Injection of Quinia.*—Mr. W. J. MOORE, of the Bombay Medical Service, extols (*Lancet*, August 1, 1863) this mode of treating malarious fever. He states that he has administered quinia by subcutaneous injection "in upwards of thirty cases of intermittent fever, and in several cases of remittent, and with almost invariable success, the former class seldom requiring a second application, the latter generally subsiding after the fifth or sixth injection. Since the period I commenced to use quinia in this manner I have been surprised and pleased to find in one of the medical periodicals that the same plan has been pursued by Dr. Chasseaud, of Smyrna, who reports 150 cures, and especially recommends the system in fever complicated with gastric symptoms, when the exhibition of quinia by the mouth is often 'inefficient, difficult, and hazardous.'

"I use the strongest solution of quinia which can be prepared—viz., thirty grains of quinia, eight or ten drops of dilute sulphuric acid, and half an ounce of water. Of this I inject from half a drachm to a drachm, the former quantity containing some four grains of the active agent. With the exception of a little sulphate

of soda if the bowels are confined, I use no other remedies whatever in uncomplicated cases of any type of malarious fever. When the spleen is enlarged, or if a leucocythemic condition is present, I prescribe, as an additional curative agent, one or other of the preparations of iron—very frequently the citrate of iron and quinia.

I generally inject beneath the skin over the outer belly of the triceps extensor muscle, and sometimes over the deltoid. I have, however, used the syringe with equal effect on the thigh and calf, and in cases of enlarged spleen have thought the action of the remedy increased by injecting over that organ. I use a small glass syringe with the screw action, and furnished with a sharp silver point some half an inch in length. The latter is introduced beneath the integument half an inch or less, and the pain is not greater than the prick of a pin. Indeed patients have frequently declared they would rather submit to this process than taste the bitter of quinia. I have never seen the slightest inflammation or irritation follow the operation except in two instances. In one of these this result was due to the instruments employed—namely, a small trocar and common glass syringe; in the other, to quinia in *suspension* being used instead of in *solution*. Indeed, I have reason to think that quinia in suspension is very irritating to the tissues, and this is what physiology would lead us to expect, as it is certain that when a fluid material is introduced into the areolar structure, it will be absorbed more directly than any solid mass could be. Therefore, to avoid irritation of the parts, and, also, to prevent "choking" of the syringe (and which instrument was procured from England), I insist upon a perfectly clear solution of the alkaloid.

The best time to inject is shortly before the expected cold fit, but it may be done during the first stage with the effect of lessening and sometimes stopping the whole paroxysm. Latterly, when a patient presents at the morning visit, who expects an accession during the day, I have injected at the time, and nearly invariably the fever has stopped.

In cases of remittent I have endeavoured to inject during the remission, but do not wait for this period. In severe cases the injection should be repeated at intervals of six or eight hours.

I believe four or five grains of quinia injected beneath the integument are equal in their effects to five or six times that amount taken into the stomach: also, that the effects are more certain than when taken in the ordinary method; and, also, that relapsing attacks are less common than when the remedy is administered by the mouth.

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18. *Treatment of Suspended Animation.*—The number of the *British and Foreign Medico-Chirurgical Review*, for April last, contains an account by Dr. B. W. RICHARDSON of his interesting researches on this subject. The following are the conclusions to which they lead:—

1. They indicate that artificial respiration can prove of avail only while the heart is transmitting a pulmonic wave of blood, and that in the absence of this wave, artificial respiration is injurious; injurious to the lungs and fatal to the blood.

2. They indicate that if a current of blood can be made to traverse the arterial channels, the muscles of respiration, previously at rest, will resume their action; and that respiration will follow, as at birth.

3. They point out that the effect of gentle external warmth is to induce an arterial tide; and that in every inquiry in respect to re-animation, the most careful attention must be directed to the further elucidation of this one subject.

4. They point out that galvanism is a dangerous remedy in all cases; that its effects cannot be measured, and that while it may set up a temporary excitation, it wears out excitability.

But, more than all, they indicate that between the time of so-called death and the period of the coagulation of the blood, re-animation is a possible fact; that the same rule, being applied to the body at large, as is often applied to the finger or other part of the body removed by accident—namely, the re-establishment through it of a blood-current—the body would re-live as a whole as it does

in part; in a word, they show that the old principle, however it may at present fall short of demonstration, is true: "that which is of the local is of the general."

[In connection with this, we would refer to some researches by the same investigator, which we gave in the number of this Journal for June, 1862, p. 232.]

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19. *Dietetic Treatment of Albuminuria.*—The researches of M. Hamon, contained in a note on albuminogenesis communicated to the Académie de Médecine on the 29th April, 1862, appear to throw considerable light upon the question whether any kinds of aliment increase or diminish albuminuria. He found, for instance, that soft-boiled eggs were very easy of digestion, and exercised a very slight albuminogenic influence, and it has therefore been suggested that in albuminuria an albuminous diet might be ordered, composed principally of soft-boiled eggs and albuminous water. Vegetable diet has also been sometimes employed in albuminous anasarca, sometimes with partial, sometimes with perfect success. But all kinds of diet that have been adopted in albuminuria are inferior to that of milk, as recommended by M. Guignier. The latter physician adopts the treatment of albuminuria devised by M. Serres, and which is founded on the combination of three plans—namely, the diminution of drink, the milk regimen, and the use of raw onions. The plan consists in choosing the milk with great care as to its freshness and quality, in substituting one milk for another when the first disagrees with the patient, allowing the patients to determine the quantity they drink, uniting lime or magnesia with the milk when it causes acidity, and abandoning the treatment at the end of twenty days, if it has not produced a decided good effect. M. Guignier believes that the diuretic property of the raw onion has a beneficial effect upon the disease, and that these vegetables ought to form part of the milk regimen. The editor of the *Bulletin Général de Thérapeutique* thinks that albuminuria may be cured by dietetic means, if they are adopted early, when the effusions are recent, and before the albuminuria has lasted long enough to have produced in the renal tissues the organic changes which place the case beyond the hope of cure.—*Brit. and For. Med.-Chir. Rev.*, July, 1863, from *Bull. Gén. de Thérap.*, March 15, 1863.

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20. *Use of Perchloride of Iron in Diphtheria.*—It is now generally admitted, that the pseudo-membranous formations of the throat or larynx ought to be treated with tonics instead of antiphlogistics. M. Courty is persuaded that these diseases are of an adynamic nature, and he disapproves of any measure which would have the effect of weakening the organism, admitting only such remedial means as are of an opposite nature, such as a substantial and restorative diet, and among medicines, cinchona, and especially iron, which without being a specific, he regards as assisting essentially in the cure. He considers the solution of the perchloride of iron to be the best of the ferruginous preparations, but he thinks that there are some others which may be preferred in certain cases, as, for instance, the iodide of iron in scrofulous children. M. Courty employs the perchloride in two forms: 1. Internally, in the dose of twenty-five to thirty drops in a glass of water in twenty-four hours, given in teaspoonfuls, and each dose followed by a mouthful of milk to remove the styptic after-taste. He continues the medicines, even after the cure, for a sufficiently long time to restore the strength and to shorten the convalescence. 2. He employs it locally, if not to the exclusion of every other topical application, still with a marked preference, and the reason of the preference is, that the solution has at once a caustic, hæmostatic, and tonic action, by virtue of which it very favourably modifies the surface after the removal of the false membrane, and spares the neighbouring parts, which are not denuded of epithelium; and besides, if it is impossible to remove the diphtheritic patch, the perchloride of iron possesses the valuable property of acting upon it and penetrating it, of infiltrating itself under its edges, and thus going on to reach and modify the subjacent tissue.—*Brit. and For. Med.-Chir. Rev.*, July, 1863, from *Researches on Croup and Diphtheria.* Montpellier, 1862.

21. *Sarracenia Purpurea in Smallpox.*—Mr. J. F. MARSON, Surgeon to the Smallpox Hospital, London, in a communication to the *Lancet* (July 4, 1863), states that he has used the sarracenia in smallpox, and has not observed from it any effect whatever. "It did not save life; it did not modify in the least the eruption of smallpox; it did not influence any of the secretions; it did not increase the secretion of urine; in only one instance did it seem to act on the bowels, and this seeming effect might easily have been from other causes."

Notes of fifteen cases treated by the sarracenia were given, all of which terminated fatally.

SURGICAL PATHOLOGY AND THERAPEUTICS, AND OPERATIVE SURGERY.

22. *Curability of Abscess in the Brain.*—In a recent communication to the Academy of Sciences, in Paris, M. FLOURENS relates some extraordinary facts concerning the brain, resulting in part from his own experiments. He quotes several instances, recorded in history, of cures effected, in cases in which the brain received serious injuries; among them that of a young officer in the time of Fronde, whom Cardinal Mazarin had always refused to promote on the plea "that he had no brains." In one of the engagements of those stirring times, this young man received an enormous wound on his head. The surgeon in whose hands he was, astonished at the quantity of brain which issued from the wound, preserved it in spirits, and subsequently, after this patient had recovered, showed it to him. "Oh!" exclaimed the latter, "pray send that to the cardinal, to prove that I have more brains than he is aware of." Another case mentioned was that of a young man of sixteen, who had been struck by a stone on the left parietal bone. As the bone did not present any appearance of fracture, the treatment employed by the surgeon, Lapeyronie, was of the simplest kind. But on the 25th day, the patient's right eye began to grow weak, and three days later its power of vision had ceased, the patient himself being in a state of absolute prostration. Lapeyronie made several incisions on the skull, which he trepanned three times; the dura mater was relieved of a few splinters which pressed upon it, after which he opened it, and a quantity of purulent matter issued forth. Immediately the prostration ceased, and the patient recovered his eyesight and the complete use of his other senses. At the end of two months he recovered his health entirely, although he had lost a considerable quantity of brain. M. Flourens then recalls to mind several experiments of his own on animals, which he deprived in some cases of one lobe, and in another of both lobes of the brain, the animal living upwards of a year after the operation; but having lost all its senses, and being reduced to the state of a mere automaton. In another instance the whole cerebellum was extracted; the animal lived for more than a year after the loss, but never recovered the regularity of its movements, being reduced to a permanent state of apparent drunkenness. M. Flourens next proceeds to describe certain new experiments, in which he introduced leaden bullets into the brain of rabbits and dogs. The bullets were placed on different points of the upper region of the encephalon, on the lobes, and the cerebellum. The bullets, left to the action of their own weight, penetrated by degrees into the substance of the brain, and ultimately stopped at the basis of the cranium. The passage thus opened through the substance soon closed and healed; and if the bullet was not too large, none of the regular functions of the animal were disturbed, and no inconvenience whatever was produced.—*Ranking's Abstract*, vol. xxxvii., from *Gazette Hebdomadaire*, Nov. 28, 1862.

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23. *Treatment of Damaged Brain from Mechanical Injury.*—Mr. PAGET, Surgeon to St. Bartholomew's Hospital, in a clinical lecture on a case of fracture of base of the skull, makes the following excellent remarks on the treatment of damaged brain:—

What is the treatment of fracture of the base of the skull? As regards the

fracture, all we can do is to leave it alone. Occasionally, recovery will take place. As regards the damaged brain, do nothing but shut out all possible sources of mischief. For instance, keep away all possible causes of excitement. Just as we would keep a hurt joint quiet, so we ought to keep a hurt brain quiet. When the patient even looks or thinks, or is roused up, it is like moving the injured brain. In private practice it is difficult to keep the patient quiet, but in hospitals this can be more easily managed. The friends of such patients almost insist on something being done. This question of treatment may be illustrated by the way in which we treat an injury elsewhere, as, for instance, a bruised muscle. There is nothing to do but to keep it at rest. Would it occur to any one to bleed here? And yet it occurs to men of sense to bleed because a man has hurt his brain. What good would it do in injury to a muscle to give mercury? And yet it seems not unusual to give mercury in injuries to the head. Of course there are cases in which there are distinct indications for this kind of treatment. Its adoption as a matter of routine in injuries to the head was to be deprecated. If (Mr. Paget said) the surgeon is not prepared to give mercury in bruised muscle, he has no ground whatever for giving it in injury to the brain. If, however (he continued), his patient had had symptoms of inflammation, he would proceed to treat it, but as yet he had had no symptoms of the kind. Delirium, convulsion, or other symptoms of cerebral disturbance, are not sufficient alone to establish the diagnosis of inflammation of the brain. The signs to be relied on are those that would indicate inflammation elsewhere—the pulse full and rapid, breathing rapid, skin hot, and the organs of sense acute, and the pupils acting more rapidly. If these symptoms are not present, we ought not to bleed or give mercury, on account of delirium or convulsions, or other symptoms of cerebral disturbance.

What we ought to do is, as before mentioned, to keep away from the patient all possible sources of excitement. We ought also most carefully to attend to the bowels and to the digestive organs. We should keep in mind that the patient can digest little, and, therefore, give but little, and that generally fluid. If the general health should flag, then we should give wine. * * *

In reference to treatment of inflammation following injuries, Mr. Paget said, that if the symptoms set in soon after—*e. g.*, within the first two or three days of an injury, or of an operation—we might bleed or depress the patient, or at least refrain from stimulating him. But, when the symptoms set in later—*e. g.*, as in this case, on the eleventh day—then clearly the inflammation was an asthenic one. It was analogous to erysipelas setting in some days after an operation. If, after an amputation, we find tenderness and swelling of the stump within two days, we may treat it with depressing means, apply leeches, or cold lotions, or, perhaps, rather, merely keep the patient quiet, and refrain from stimulants and full diet. But if on the eleventh day the stump were to inflame, we should treat the patient with good diet and stimulants. Just so in injuries to parts we cannot see. If after ten days signs of inflammation set in we ought to give wine, just as we ought in erysipelas of the scalp setting in at that time. In fact, we ought to be guided by the time when the symptoms set in, as well as by the symptoms themselves. The man's breathing was more frequent, but it was more shallow; his pulse was quicker, but it was more feeble, so that everything indicated stimulants. That the treatment was unsuccessful does not necessarily show that it is wrong. In fractures of the base of the skull, if we save one in twenty, we should do very well indeed.—*Medical Times and Gaz.*, Feb. 21, 1863.

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24. *Management of Patients after Surgical Operations.*—Mr. Paget, in his anniversary address on this subject before the British Med. Association, remarks that, though the preference of immediate union is generally just, it may become an unwise prejudice. "When that mode of treatment is attempted and fails, it may lead to something more than disappointment—it may be very mischievous, for there is no local source of blood-poisoning more effectual than the retention of blood or pus till they decompose behind the edges of a wound unwisely united. The rule, therefore, for the choice of modes of healing may be always in favour of union by the first intention, when there is a reasonable

probability that it can be, at least, in good part accomplished; but when there is less than a reasonable probability, to make no attempt at it. The local treatment may be summed up in two words—repose and cleanliness. The cleanliness should, however, include more than it commonly does, such as the use of general or large local baths, the value of which, especially after lithotomy and other perineal and pelvic operations, cannot be overstated; and of the frequent change, not only of dressings, if there be any, and of bed-linen, but of beds; and, during convalescence, the change of rooms or of one part of the ward for another. As to general treatment, the best plan is to let the patients be as nearly as possible in the ordinary mode of prudent life, to give no medicine of which the need is not expressly indicated, to observe all rules of personal cleanliness, to provide abundant fresh air, and a sufficient or a liberal mixed diet.

"I believe, then, that in our retrospect of the management of patients after surgical operations, we may congratulate ourselves on the increasing simplicity of our practice, founded on the wider recognition of the sufficiency of the natural processes of recovery. And herein surgery may be said to have been a good contribution of that more accurate study of the natural history of disease which is becoming the most pressing want of our time. What will happen if this or that injury or disease be left to itself, or only so managed as the patient's comfort may suggest? The question has been often asked, but rarely answered; yet it must be answered before we can accurately study the value of any medical or surgical remedy. It is the question in therapeutics that should most occupy our minds; for until we have made our standards of what the progress of disease is if left alone, we cannot judge of our power of controlling or of remedying it."—*British Med. Journ.*, 1862.

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25. *Treatment of Tetanus by Large Doses of Morphia.*—In an extremely severe case of tetanus in a boy of fourteen years of age, twenty days after the cure of a puncture of the sole of the left foot by a thorn, Dr. GRESSY employed the hydrochlorate of morphia in large doses; and although the tetanic convulsions had already seized the diaphragm and the extrinsic muscles of the thorax, he had the satisfaction of saving the patient's life. As soon as the first symptoms of *morphinic* poisoning (sleep and abundant sweating) were manifested—namely, less than twenty-four hours after the commencement of the treatment, the tetanic symptoms made no further progress. The fits came at longer intervals, but at every attack the trismus, opisthotonos, and the abdominal and thoracic stiffness preserved their intensity. The fits soon diminished in length, and lastly the convulsions became less violent. Dr. Gressy was obliged to wait a week before all traces of convulsion had disappeared, and during this time the nervous system of the patient remained permanently *morphinized*. When the sleep was tranquil and continuous, and the sweating profuse, the morphia was discontinued for twelve or twenty-four hours, and then its use was resumed. Miliary eruption and itching exhibited themselves at the same time that the tetanic convulsions began to diminish. Dr. Gressy therefore believes that the want of success which has often been observed in cases of tetanus treated by morphia, is due to the timidity with which the remedy has been employed; and he observes, that the tetanus, when arrived at its highest degree of intensity, began and continued its retrograde course in proportion as the *morphinic* poisoning affected the innervation.—*Brit. and For. Med.-Chir. Rev.*, July, 1863, from *L'Union Médicale*, May 26, 1863.

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26. *Fractures.*—Mr. W. H. B. WINCHESTER makes (*Lancet*, Aug. 22, 1863) some remarks on the principles of treatment of those accidents which are worthy of consideration.

"In the first place," he says, "with regard to Extension. The views entertained respecting it are so erroneous, that until they are entirely abandoned no improvement can take place. Muscular contraction has been, and still is, the real bugbear: To counteract its supposed baneful influence, or in other words, to keep up permanent extension, has been the chief object sought to be attained, and no combination of forces the ingenuity of mechanicians could devise has been considered too powerful to attempt its accomplishment. Look, for instance,

at the powerful screws attached to the extremities of some instruments—at the railway splint of Professor Dummreicher, some time since used in St. Bartholomew's Hospital, by which the lower part of the splint, supporting and holding in its grasp the lower or separated portion of the limb, is so contrived as to run away with it to the utmost limit of muscular elasticity. Such, too, is the effect of the practice of attaching a heavy weight to a cord from the foot, and letting it run over a pulley at the end of the bedstead. A similar result also follows the application of the most commonly used of all splints—viz., Desault's long splint, and of all ordinary forms of apparatus. Extension, therefore, as at present understood and practised by the above means, is a persistently active, and as such an injurious force. It can only be beneficial when temporarily employed to effect replacement. As soon as this is accomplished it ought to be superseded by the passive, enduring, and consequently beneficial force expressed by the term Retention.

"Now this much-dreaded muscular contraction, the involuntary result of fracture, hitherto considered so obstructive, discarded as even worse than useless, and opposed as injurious, is, if rightly understood, a natural power of inestimable value, supplying the exact amount of forcible contact between the broken surfaces necessary to excite healthy reparative action in the most speedy and perfect manner, accurately adjusted to the functional capacity of each individual case. That this view is correct, physiologically, pathologically, and mechanically, will undoubtedly be admitted. At least nine-tenths of the cases of ununited fractures of tardy union and deformity, may be attributed to the misunderstanding, neglect, or overlooking of this obvious pathological effect of muscular contraction.

"Paget, in the last edition of his admirable treatise on Surgical Pathology, when speaking of ununited fractures (p. 193), remarks: 'In other cases the failure seems to occur earlier. No reparative material is formed, and the fragments remain quite disunited. This may be the result of accidental hindrances of the normal reparative process; but it sometimes appears like a simple defect of formative power—a defect which, I believe, cannot be explained, and which seems the more remarkable when we observe the many changes which may at a later time be effected, as if to diminish the evil of want of union.' Is not this its true solution or explanation—viz., that nature, not unequal to the task, has only been deprived by art of the very means which she has specially provided for its accomplishment? How is this provision of nature to be rendered available? By adopting the means I have frequently had occasion to describe—viz., the necessity of aiding and directing nature by suitable, and not retarding or obstructing her by improper, forms of apparatus."

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27. *An Easy Method of Reducing a Dislocated Humerus.*—Dr. Garms describes the following modification of Cooper's procedure. The patient is laid upon the floor, not on his back, but on his belly, some cushions intervening. A towel is attached to the humerus above the elbow, and another, passed round the upper part of the humerus, is given into the hands of the assistant, standing on the side of the dislocated arm. The operator, sitting down on the floor, on the same side, lays hold of the lower towel, and applies the heel of the foot lying nearest the patient to the axilla. He makes extension backwards and downwards, while the assistant draws laterally. The dislocation is thus reduced with surprising facility, the agency of chloroform not being required. The advantage of this modification is that extension backwards may be far more easily executed than when the patient is in the supine position; and this is the direction required in dislocation forwards, which prevails in the great majority of cases. For dislocation backwards, which is very rare, Cooper's procedure is the best.—*Brit. and For. Med.-Chir. Rev.*, July, 1863, from *Archiv. der Heilkunde*, No. 2, 1863.

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28. *Tracheotomy in Children.*—M. Giraldes is of opinion, that the rules laid down for this operation in surgical treatises are not explicit, and that the great variety of instruments which have been proposed tends rather to increase than to remove difficulties, and to confuse the mind of the operator. Ingenious in

their construction, they seem capable of fulfilling every indication, and of enabling hands, however inexperienced, to perform the operation without much difficulty. Most of these inventions testify rather to the ingenuity than to the experience of their constructors. For its rapid execution, tracheotomy requires none of these special instruments—a convex bistoury, slightly pointed, a dilating forceps, and two blunt hooks, constituting all the necessary apparatus. The canula in croup is indispensable. The following rules for the operator may be laid down:—

1. *The Position of the Patient and Assistants.*—This is a very important preliminary, embarrassment and difficulties sometimes resulting from the faulty manner in which the patient has been placed and maintained. The child should be laid on a mattress placed upon a table, having his neck supported by a bolster, and his head thrown forcibly backwards, an assistant kneeling down behind, supporting it firmly in this position by placing his hands over the jaws. Another assistant should fix the shoulders so as to prevent the slightest movement. The patient is thus maintained immovable, and there are none of the oscillations of the trachea which various instruments have been contrived to prevent.

2. *The Operation.*—The operator, standing on the right of the patient, carries his incision, three or four millimetres in length from the cricoid cartilage, rapidly, but without precipitation, as deep as the thyroid gland before it becomes necessary to stop and sponge away the venous blood. The forefinger is then passed into the wound and fixes the trachea, its nail serving as a conductor to the bistoury with which the puncture in the trachea is made. Without removing his nail from the wound in the trachea, the operator slides in the dilating forceps along it, and by a slight pressure secures enough dilatation for the admission of the canula. The child should now be set upright, in order to facilitate the expulsion of false membrane or blood from the air-passages. The end of the canula should be carried directly to the bottom of the wound, in order to prevent its sliding off in front of the trachea. Before securing it, the fact of its entrance into the air-passages must be carefully ascertained. The aperture in the trachea ought not to be of too large an extent, and even if it be made too small it may be easily enlarged by means of a probe-pointed bistoury. During the operation the child should be well covered, and carefully protected from all chills.

3. *Accidents during the Operation.*—The sliding of the canula in front of the trachea has already been adverted to. *Hemorrhage* usually ceases when normal respiration has become established naturally or by artificial means, such as frictions or taps of the thorax, made with the view of regularizing the play of the respiratory muscles. The hemorrhage almost always proceeds from veins, which are sometimes numerous and distended; and when the incision has been carried to a great extent, so as to approach the sternal *fourchette*, there is a great probability that numerous and voluminous venous trunks may have been opened. If the bleeding persist, rounds of agaric, dipped in Commander's balsam, should be applied. When the blood bubbles up by the side of the canula, the wound of the trachea has been made too large, so that the blood gets entrance during inspiration. A larger canula should at once be substituted. When the operation has been a laborious one, *emphysema of the neck*, sometimes extending to some distance, may be met with. It usually results from a want of parallelism between the cutaneous and the tracheal wounds. Ill-repressed movements of the child may have displaced the trachea, or too great a delay in introduction of the catheter may have favoured the passage of the air into the cellular tissue. The same result may occur from the tracheal wound being too large or the canula too small. Frictions and shampooing the emphysematous region should be employed.—*Brit. and For. Med.-Chir. Rev.*, July, 1863, from *Bull. Gén. de Thérap.*, No. ix.

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29. *Intra-orbitar Aneurism cured by Ligature of the Carotid after Failure of Digital Pressure.*—Mr. ERNEST HART relates (*Lancet*, March 15, 1862) the following unique case of traumatic arterio-venous aneurism of the frontal branch of the ophthalmic developed within the orbit:—

Richard T——, boy, aged 11, quarrelling in the street with another lad, received a blow from the forked end of an iron rib of a parasol at the inner angle of the left upper eyelid, about four years since. Rapid swelling of the eyelid followed. In a few minutes a considerable effusion of blood into the eyelid had occurred. It swelled to the size of a pigeon's egg, and became purple in colour, altogether obscuring the eyeball, since the lid could not be raised. The wound bled very freely. By the aid of pressure the bleeding was arrested. Subsequently, under the influence of time, cold lotions, and leeches, the swelling of the eyelid subsided, the eye remaining somewhat bloodshot. No ill effects were apparent.

The boy returned to school, and went on as usual. He used to complain afterwards of headache and singing in the ears; but it was not until the end of 1860 that the attention of his mother was drawn to a swelling in the site of the original wound of the lid, which beat with a perceptible pulsation. This gradually increased in size; the lid became protuberant, the eye projecting, and somewhat unduly vascular in its conjunctival surface. He was brought to my house on the 19th of January, 1861.

There was an aneurismal swelling at the inner angle of the orbit, just below the margin of the bone; it pulsated strongly. There was a perceptible thrill, and a very loud, whizzing bruit could be heard over all the left side of the head and temple. This bruit was continuous through both systole and diastole, but louder during diastole. Hence I inferred that there was a communication between the artery and vein, and that this was an arterio-venous aneurism, resulting from the transfixion of the frontal branch of the ophthalmic artery and its satellite vein by the forked end of the piece of iron. There was no scar perceptible where the external wound had been. The eyelid was swelled, and some dilated vessels coursed over the ocular conjunctiva of the globe, which was itself more prominent than that of the opposite side. The general health of the lad was good. He complained of a whizzing noise in the head, like that of a steam-engine at work, and he suffered from headache.

After causing my diagnosis to be verified by Mr. Erichsen, I resolved to apply digital pressure to the left carotid artery, with the view of obtaining a cure in the same way as we are in the habit of doing in treating aneurism in other parts of the body. Although entertaining the highest opinion of the capabilities of this always innocuous treatment, I had not any great hope of its success in this case. That method is most effective to cure where a definite sac or diverticulum of the blood exists, and where, by retarding the circulation, the deposition of layers of fibrin on the roughened walls of the sac may be obtained. Here, however, there was but a small sac, situated between the artery and vein, and communicating with both. I had put the boy under chloroform to facilitate the perfect examination of the aneurismal disease; and by passing the finger between the eye and the roof of the orbit, it could be felt that the projection at the angle was due to an enlarged and tortuous coil of artery, and that the artery was tortuous and dilated along the roof of the orbit. Here, then, was a case of arterio-venous aneurism, with the cirsoid dilatation of the artery, and probably also of the vein, which commonly accompanies that disease. In such a case there is no roughened sac; the arterial blood passes by a smooth aperture into the vein: and these are conditions under which it is almost hopeless to expect that indirect pressure will effect a cure—almost hopeless, but not quite. I felt it right, therefore, to employ digital pressure on the carotid during three weeks, organizing for that purpose a staff of three persons, who maintained intermittent but complete pressure during several hours daily for that period. It was very easy to stop pulsation in the projecting tumour by pressure on the carotid, and the arrest of the pulsation always afforded the visible sign that the pressure was complete. In cases of true aneurism, some surgeons have thought it desirable that the pressure should be continuous and incomplete, allowing a small stream of blood to flow through the tumour and deposit its fibrin. In arterio-venous aneurism I have no doubt that it should be intermittent and complete, for here the object is, by stopping the flow of blood from the artery into the vein, to seal in the first instance the aperture of communication. If this complete pressure be not intermittent, faintness follows from the interference with

the circulation of the brain. This boy always bore fifteen minutes of pressure well. At first we all thought there was a marked improvement; and the boy said he did not suffer so much in the head. However this may have been, at the end of three weeks there was much the same state of things as before. After some consideration I resolved to tie the common carotid artery, as offering the best means of cure.

In March, I operated, in the presence of Mr. Erichsen, Mr. T. Holmes, Mr. Walter J. Coulson, Dr. B. W. Richardson administering the chloroform. The operation lasted but a few minutes, and neither the vein nor nerve was seen. The ligature of the common carotid immediately caused the flattening of the pulsating tumour, and an entire cessation of its beat. On recovering from the chloroform, the boy was calm and sensible: there was no perceptible change of temperature in the heart, or in the eye, or in the neck. He slept well that night, and the most remarkable point in all the after-progress was the total absence of any symptoms which could have led to the supposition that the great artery of the neck had been tied, or that anything had been done to interfere with the circulation of the brain. The ligature fell on the eighth day. The patient was seen during his convalescence by Mr. Erichsen and Dr. Richardson. The only point to be noticed was, however, the absence of symptoms.

Looking at the frequency with which ligature of the carotid has produced the gravest symptoms of brain disorder, and the occasions on which it has been followed by softening of the brain, paralysis of the opposite side, and death, I was disposed to think—and it was also the impression of Mr. Erichsen—that this boy had a great advantage in that the collateral circulation had been developed previously by digital pressure, and the sudden diversion of the blood was hence attended with little or no shock to the brain. It was in this hope that I persevered in the use of digital pressure before the operation, after it was evident that it was not likely itself to effect a cure. I think it may perhaps be recommended that this preliminary measure should in future always be adopted, if only with that view.

The final result of the ligature has, in this case, been satisfactory. There is not, at the present time, any trace of the tumour, or pulsation at the angle of the eye. The sight is perfect. He has no pain or noises in the head; he runs about, and is clever at his book. There may be heard, by applying a stethoscope to the head, a whizzing bruit. This has been noticed in other cases after cure, but it has not affected the permanency of the cure. I attribute it to the retrogressive dilatation of the arteries which had occurred during the progress of the disease. This slightly cirsoid condition will probably remain.

In the following table may be seen a list of the recorded cases of intra-orbitar aneurisms treated by ligature of the primitive carotid, with the result:—

Author.	Date.	Result.
Travers	1804	Successful.
Dalrymple	1812	Successful.
Roux	1829	Success incomplete.
Scott	1834	Successful.
Busk	1835	Successful.
Jobert	1839	Successful.
Velpeau	1839	Success partial.
Van Buren		Successful.
Herpin	1844	Successful.
Pétrequin	1845	Death.
Brainard	1852	Unsuccessful.
Curling	1854	Successful.
Nunnely	1852	Successful, sight gone.
"	1856	Successful.
"	1858	Death.
"	1859	Successful.
Bowman	1859	Death.
"	1860	Successful.
Syme	1861	Successful.
Hart	1861	Successful.

It will thus be seen that the statistical results of the operation are not unfavourable, considering the magnitude of the vessel ligatured, and its importance to the nutrition of the brain. Out of the twenty cases which are here tabulated, in three cases the ligature of the common carotid was followed by death. In two the success was incomplete. In a sixth case the pulsation of the tumour was unabated by the operation. There remain fourteen successful cases out of twenty.

Mr. Hart attaches great importance to the treatment by compression of the artery leading to the aneurism, and he cites two cases in which this plan was carried out most successfully. If this plan has not been earlier applied to the treatment of orbital aneurisms, the explanation must probably be found in the fact that continued instrumental compression of the carotid artery in the neck is a proceeding of almost insurmountable difficulty. Since Professor Vanzetti, of Padua, has perfected the application of digital compression, this difficulty no longer exists. Digital pressure was maintained in the case of R. T—— without inconvenience. It failed to effect a cure, but it probably modified favourably the condition of the tumour, and developed usefully the collateral circulation of the brain. In the first case, that of Maria O——, treated by Professor Gioppi, of Padua, the cure was effected by compression for a few hours in four days; in the other case, that of Catharina B——, treated by Dr. Scaramuzza, of Verona, by intermittent compression occupying seven hours and twenty minutes in the course of eighteen days. It may perhaps serve to show how slowly the news of surgical progress may reach even the best-informed quarters that no reference whatever is made to these cases in Mr. Nunnely's paper in 1859, nor does this surgeon mention the probability of effecting a cure by this simple means.

Case 1. Maria O——, aged 42, entered the clinique of the hospital of Padua, July 4, 1856. She was of feeble constitution. Seventeen days previously, during an effort of childbirth, she felt as though her eye had started from the orbit. Four days afterwards the lids and globe of the eye were immovable, and there was complete blindness. On admission, the aspect of the patient was frightful. The eye lay motionless on the cheek; the pendulous lid was red and livid; the cornea infiltrated and opaque; blindness complete. There were pulsatory noises in the head, and the finger, when pressed back at the upper border of the orbit, felt an elastic aneurismal tumour thrusting forward the eye. Compression of the carotid very soon produced faintness, and Gioppi employed the method of Valsalva, fearing to use ligature. It failed. Digital compression was then employed for a minute or two at a time, suspending it when faintness threatened. This compression was effected with the finger by the patient herself, and some of the convalescents and others in the ward. The effect was of the happiest kind. On the following day there was already a diminution in the force of the pulsations; and at the end of the fourth day all pulsation had ceased. From that time all went well. Finally, the eye retreated within the orbit and sight returned, the patient remaining only somewhat myopic and with a dilated pupil.

Case 2. Catharina B——, of Verona, a washerwoman, aged 49, small and weakly, was admitted into the eye ward of the civil hospital of Verona on April 4, 1858. She was weak in health and subject to palpitation. A few days previously, after a violent access of fever, she felt an acute pain in the left orbit and ear; something seemed to give way in the orbit; the eye became enlarged, and the patient could not distinguish light from darkness. On her admission, the left eye projected entirely beyond the orbit; the lids did not cover the ball; the eye red; cornea dull. The patient could hardly discern the light. There was pulsation and thrill over the orbit and left temple. She was the subject of dilatation of the heart and of the arch of the aorta. Digital compression of the carotid was therefore employed here very cautiously, for not more than five minutes at a time. Summing up briefly the carefully recorded details of the case, it may be said that during the eighteen days that the treatment lasted, the space of time during which compression was used amounted only to seven hours and twenty minutes. The eye had then entirely entered the orbit, and pulsation had ceased. The cure was complete.

30. *Popliteal Aneurism cured by Digital Compression.*—Mr. GEO. SOUTHAM read before the Royal Med.-Chirurg. Soc., June 23, 1863, a case of this. The patient was in his thirty-third year, an iron moulder by trade. From the man's account the disease did not appear to have been of more than nine or ten weeks' duration. He was admitted into the Manchester Hospital on the 29th of December, 1862. The right popliteal space was distended by a pulsatile swelling, accompanied by severe pain and general œdema of the leg. The pulsation of the tumour was very perceptible, but feeble, and the skin over it slightly discoloured. His countenance bore indications of severe suffering. Pulse 120, small and quick; appetite bad. So urgent did the case appear that clamps were immediately applied over the femoral artery. The limb was enveloped in flannel bandages, and elevated on pillows; bottles of hot water were placed near, to raise the temperature of the foot and leg to the natural standard. The following day the clamps were removed, as they had produced redness and vesication of the skin. Iodide of potassium was now prescribed, and regularly taken until the 20th of January, with no apparent improvement. Digital compression was then resorted to, twelve students of the institution having volunteered their services. During the first twenty hours this system of pressure was frequently interrupted, and therefore at the end of this period the pulsation had apparently undergone no change. Consequently, two students were directed to be continually with the patient, one to compress the artery, the other to apply his hand over the aneurism to detect any inefficiency of the pressure. This plan was adopted for twenty-four hours: a very slight pulsation only could then be felt in the tumour, and six hours later it had entirely subsided. Moderate pressure was, however, kept up for another day, and then discontinued, as there were no signs of any further pulsation. From this time the case proceeded very satisfactorily, the man leaving the hospital at the end of three months, with scarcely any remaining trace of the disease.

Mr. Southam considered that pressure must now be regarded as the established system of treating aneurismal tumours whenever practicable; but the best mode of applying it is still a subject for discussion. In the present case the vitality of the limb was evidently too much impaired to admit of the application of instrumental pressure; indeed the unusual size of the tumour, the unsatisfactory condition of the surrounding parts, as well as the patient's general health, formed in themselves serious obstacles to any kind of operative interference. Many are the advantages of digital over instrumental compression. Not only does it seem to effect a cure in a shorter period of time, but with much less pain, and is not so likely to lead to sloughing of the structures under pressure, which with the greatest precaution is liable to occur in some cases. The flow of blood through the aneurism may not be so effectually prevented by this means, and indeed this is not to be desired, as fibrillation of the blood is more likely to occur, and to be more permanent, if allowed to pass through the sac in small quantity and in a slow continuous stream; for digital compression is not liable to those sudden alternations in force and volume which under instrumental pressure are apt to take place in consequence of the tendency of the artery to escape from under the clamps on any slight movement of the limb. But pressure alone must not be entirely relied on in the treatment of aneurism; for as success depends on the consolidation and subsequent absorption of the blood in the tumour, other agents of similar properties, to combine with, must be sought for. The difficulty in arriving at correct views of the medical treatment of aneurism is probably owing to our imperfect knowledge of the changes which contribute to the solidification of the aneurismal contents.

The process is usually regarded as similar to the coagulation of the blood out of the body; but it is questionable if this be exactly so where the solidified material is partially absorbed or converted into structure. Ordinary coagulation of the blood is one consequence of its diminished vitality, and therefore would more likely be followed by its removal from the body by ulceration and suppuration than by absorption. It seems, therefore, highly probable that the solidification of the blood within the body, previous to its absorption or conversion into tissue, differs somewhat at least from that of ordinary coagulation. This may explain how it is that low diet, which by depressing the vital proper-

ties of the blood should promote its coagulation, has not led to those salutary results expected by its advocates in the treatment of aneurism.—*Lancet*, July 18, 1863.

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31. *Treatment of Ulcers of the Extremities of the Legs by "Sealing."*—Mr. Barnard Holt has adopted in the Westminster Hospital, with good results, a novel mode of treating ulcers of the legs. The treatment consists in excluding the air from the wound during the process of granulation, and this plan is found to assist materially in rapid cicatrization, when once a healthy action is set up.

The method of applying the dressing, as practised by Mr. Holt, is as follows: The margin of the ulcer is covered with adhesive soap-plaster, half an inch wide, and a piece of oil-silk, large enough to cover both the ulcer and the plaster, having been carefully affixed by means of collodion, another edging of plaster is put on the margin. The transparency of the oil-silk allows the progress of the ulcer to be inspected with the greatest ease.

In some clinical remarks upon cases under treatment by this method, Mr. Holt observed that "to render the treatment effective it was necessary to remove the sealing in accordance with the amount of discharge present. When the discharge is abundant, it may be necessary to remove the first sealing on the second day; but experience shows that, as the treatment is proceeded with, so the discharge gradually diminishes in quantity, and that the granulations which before the sealing were pale and flabby, become florid and vigorous. Hence, the second application of the sealing may usually be allowed to remain untouched for five or six days, and the third even longer, and so on until cicatrization is complete. No dressing of any kind is required beneath the oil-silk, which should be carefully secured, so as to exclude the air. By this simple method all irritating influences are avoided, the discharge is not too frequently removed, and the growth of healthy granulations is induced, leading to the rapid cicatrization of the ulcer.

We subjoin two cases illustrative of the treatment:—

Case 1. William J., aged 22, a sailor, admitted June 24, into Northumberland Ward, under the care of Mr. Holt, with an ulcer of the leg.

History.—About three years since, whilst on board ship, his right leg was crushed by some spars which fell upon it, and for twelve months after this, pieces of bone came from the wound, which then healed up, and was quite well for six weeks. It then broke out into an ulcer again, and continued to enlarge up to the time of his admission.

On admission there was an inflamed ulcer on the outer side of the right ankle, about two inches long and one inch wide, but not very deep. There was considerable inflammatory swelling of the surrounding parts, and he complained of burning, pricking pain in the ulcer itself. Ordered a linseed-meal poultice and, a couple of days afterward, a nitrate of silver lotion (gr. ij and ℥j).

July 1. The ulcer was sealed.

4*th*. Unsealed, and found to be diminished in circumference half an inch; re-sealed.

7*th*. Dressings renewed. Discharges a good deal.

10*th*. Ulcer much diminished in size.

14*th*. Ulcer healing rapidly, and of very small size.

25*th*. Discharged cured.

Case 2. Martha B., aged 22, a servant, admitted June 24, into Percy Ward, under the care of Mr. Holt, with ulcers of the legs.

History.—On December 28 last, she received a blow on the left leg, which gathered and was poulticed, and a large slough separated, when lotio nigra was applied. The ulcer continued to increase in size, and an ulcer appeared on the right leg without apparent cause, about three weeks before her admission.

On admission there was an ulcer on each of the legs immediately below the patella. The largest, on the left leg, was of the size of the top of a small teacup, whilst that on the right leg was of the size of a two-shilling piece. They were both very deep, with ragged edges, and discharged freely. Ordered linseed-meal poultice.

June 26. Ulcers more healthy in appearance, and less painful. R.—Acidi nitrici dil., ♏xv; decocti cinchonæ, ℥j, ter die.

27*th*. The depth of the ulcers much decreased, and their size diminished. The one on the left leg is about the size of a five shilling piece, and that on the right about the size of a shilling. Both ulcers were "sealed" according to Mr. Holt's method.

30*th*. Left ulcer of the size of half a crown, and the right of a sixpence. Ulcers re-sealed.

July 10. Ulcers unsealed, and found to be much smaller. The same dressing applied.

14*th*. The left ulcer of the size of a shilling, and the right completely healed.

29*th*. Discharged.—*Med. Times and Gaz.*, Dec. 6, 1862.

32. *Case of Strangulation of the Stomach in an Umbilical Rupture; Death during its Reduction under Chloroform.*—An account of a case of this, believed to be unique, was read before the Royal Medical and Chirurgical Society, by Mr. CHAS. H. MOORE (June 23, 1863). A corpulent woman, aged sixty, was admitted into the Middlesex Hospital, under the care of Mr. Moore, with a strangulated umbilical hernia fourteen inches in diameter. She had been operated on for strangulation ten years before, by Mr. Wormald. She was greatly exhausted, having been vomiting six days and constipated three days, and having taken calomel and been leeched and blistered. She had vomited two gallons of fluid in the previous forty-eight hours. The pulse was 120.

A drachm of chloroform and four successive portions of forty minims each were inhaled during eleven minutes. The taxis was employed, and was twice interrupted—once by her coughing, once by vomiting. It was continued four or five minutes after the inhalation of chloroform was discontinued, and until about one-third of the hernia had been reduced. She was then so feeble that all but restorative measures were stopped; in four minutes more she was dead. Pulse and respiration continued uniformly and failed proportionally until both ceased.

The cardiac and pyloric ends of the stomach were in the abdomen; the intermediate portion was fixed and constricted in the hernial ring. The cardiac portion was flaccid and empty, but was of enormous capacity. Many parts of its mucous membrane were gangrenous and black, and some were lacerated. These lacerations bore a definite relation to the œsophageal opening. The peritoneal coat near the spleen was also ruptured, and the back of the cardiac pouch was in one spot completely perforated. About a gallon and a half of black liquid, similar to that which had been vomited, lay in the peritoneum. This membrane was not inflamed, but the aperture through the stomach was partly black and pulpy, partly inflamed, partly infiltrated with the contents of the stomach, and a little ecchymosed.

The writer commented, 1st, on the unique character of the case—a complete strangulation of the stomach itself. None of the black fluid had passed into the small intestines, which contained air and a little yellow bile. 2d. On the dilatation of the cardiac portion, to the inordinate distension of which he attributed the gangrene. 3d. On the rupture of the stomach. The lacerations might have been traced to the taxis, had there been any mark of violence in the portions of the stomach within reach during that operation; but these seemed proved, by their radiated disposition with regard to the œsophagus and by the pathological changes in the principal rupture, to be due to vomiting. The perforation of the stomach might have been almost entirely produced by the vomiting, but might have been completed by the taxis. 4th. On the cause of death. The importance of the case in respect to the toxical effects of chloroform and to the supposed sudden fatality of ruptures of the stomach was considered, and reasons were offered for assigning the result to neither separately, but to both, in common with the previous and great exhaustion of the patient. Finally, it was suggested that the stomach-pump might have relieved such a case with less danger than was involved in the use of chloroform and the taxis, though actual recovery was in the highest degree unlikely.—*Lancet*, July 18, 1863.

33. *Superiority of Vulcanized Caoutchouc over any other Substance for the fabrication of Bougies.*—Professor Nelaton maintains the superiority of vulcanized India-rubber for catheters and bougies over the instruments in common use made of tissue coated with oil mixed with litharge. The latter, he says, are rigid, liable to give rise to false passages, cause pain, and when permanently left in the urethra, exercise a degree of pressure which may induce mortification and perforation. In a few days, moreover, they are deteriorated by humidity. Vulcanized India-rubber sounds, on the contrary, are perfectly flexible and unchangeable. They are inserted with greater ease, and cause so little distress, that they may be preserved in the urethra during a journey without inconvenience. They are not affected by moisture, and one of these instruments which remained in the urethra twelve days, in one of M. Nélaton's cases, when withdrawn presented no sign of outward injury, and was as smooth as before its introduction.—*Journ. de Méd. et Chir.*

OPHTHALMOLOGY.

34. *A Lesion of the Conjunctiva coinciding with Hemeralopia.*—In a recent report on hemeralopia, M. Gosselin noticed the fact of slight blepharitis or conjunctival catarrh being connected with the night-blindness assisting to explain its epidemic character, its persistence in the same regiments, and its recurrence in the same men. In the present paper, M. Bitot indicates the coincidence of hemeralopia with a lesion of the conjunctiva, occupying not the lids, but the globe of the eye, and not exhibited by signs of inflammation, but by an assemblage of shining white spots, producing a pearly or silvery spot by the side of the cornea. The author has made his observations in twenty-nine cases occurring in the Bordeaux Children's Hospital, nineteen being males and ten females; the ages varying from nine to nineteen years, these children being employed as tailors, shoemakers, and dressmakers. The lesion has been always found near the lateral part of the cornea, generally on the external side. The spot, of a pearly or silvery appearance, seems constituted of an aggregate of minute points, and may vary in form not only in different individuals, but in the two eyes of the same person. In general, it is triangular, having its somewhat concave base turned towards the cornea. The form is susceptible of undergoing change when pressure is made on the eyelids, the parts constituting the spot being simply in juxtaposition. The extent of this spot is proportionate to the completeness of the hemeralopia, and at the commencement of the disease only a few pearly points are visible. In some cases these have furnished the first indication of the approaching hemeralopia, the patients not being aware then of any disturbance of their vision. The course of the spot follows that of the hemeralopia, increasing in size as this becomes more complete, and diminishing slowly or rapidly, according to the rapidity of the cure. Not a trace of the spot remains visible when the normal vision has become restored. The existence and duration of the spot thus become a measure of the principal disease; but before concluding this to be case, M. Bitot examined the other children of the establishment, in order to ascertain whether its presence might not be a mere coincidence due to the lymphatic or scrofulous constitution so prevalent there. On examination, however, the subjects of hemeralopia were found to be some of the most healthy children, while cases which exhibited marked scrofula, independently of hemeralopia, never manifested the spots in question. These spots cannot be detached by the finger-nail, but seem to consist of epithelial layers. The conjunctiva situated between them and the external angle of the eye, loses its normal characters. It is less moist, soft, shining, and pliable, and pressure made by means of the eyelids, exhibits a very clear line of demarcation between its changed and healthy portions.

[M. Villemin, an army-surgeon, states,[1] without having been aware of

[1] Gazette Hebdomadaire, No. 21.

M. Bitot's investigations, that he had met with this white spot in an epidemic of hemeralopia occurring in a battalion stationed at Strasbourg in 1860.]—*Brit. and For. Med.-Chir. Rev.*, July, 1863, from *Bull. de l'Acad. de Méd.* No. 14.

35. *Loss of Sight from Decayed Teeth.* By Mr. H. T. KEMPTON.—Case. The patient was a gentleman, aged forty-two, of a highly nervous temperament. At the time he first visited me he was suffering from pain extending over both sides of the head and face, incapacitating him from attending to his profession, and depriving him of rest at night. The sight of both eyes was affected, but more particularly that of the right. The patient had been under treatment since June last. On examining the mouth I found there was extensive inflammation on both sides of lower jaw, owing to the presence of two decayed teeth. On the right side the first molar was considerably decayed and the pulp cavity exposed, so that on introducing a small instrument it gave rise to a violent paroxysm of pain. The tooth was somewhat loose in its socket, owing to the inflammation having extended to the periosteum. Subsequently, upon extracting this tooth I found a small sack filled with pus attached to the fangs. On the opposite side, the second molar was in much the same state, but the inflammation not so acute.

In the upper jaw all the teeth were sound.

In consequence of the pains about the head and face, I extracted the two decayed molar teeth in the lower jaw. This proceeding not only afforded relief to the patient's sufferings, but was afterwards attended by such a marked improvement in the power of vision, that there can be no reasonable doubt that the teeth had been the primary source of the eye affection. The history of the case will, however, be best understood from the following account given me by the patient himself:—

"It may be necessary to remark that for some months previous to becoming a sufferer from toothache, I had worked hard at mental employment, and my nervous system was in a very sensitive and excitable state. My lower limbs, particularly, felt as if they were *partially* paralyzed; or rather, I should say, when at all tired I was to some extent unable to control them.

"In May last I visited the North of England, and while there suffered severely from what I then believed to be tic douloureux, but now concluded to have been toothache. It commenced on the left side of the lower jaw, doubtless from the pressure of the wisdom tooth upon the decayed tooth lately extracted. The pain I endured was excruciating, and was not confined to the lower jaw, but spread entirely round the face, and was at times acute in the ears and about the temples.

"On returning to London, I suffered greatly from pains in the teeth on both sides of the lower jaw, but found that the right ear and temple were more affected thereby than those on the opposite side.

"At length, about October 14th, I suddenly found that the sight of my right eye was all but gone. Attributing this to cold, I, as I now believe, very improperly, applied a warm poultice overnight. On the following morning I found my sight by no means better, and after foolishly dallying for a week or more, was advised by a friend to go to the Ophthalmic Hospital, which I did, and explained to the surgeon, Mr. Jabez Hogg, that I had been suffering from the toothache as I have previously described. He at once prescribed for me, and said that if I valued the sight of my eye, the offending tooth must come out. I accordingly went to a dentist to whom I had been recommended, and told him that I must leave him to judge which tooth it was, as owing to the general pain in the teeth in the locality (the right side of the lower jaw) I really could not fix upon it. He selected the wisdom tooth, which Mr. Hogg subsequently told me was the wrong one, and pointed out the tooth afterward extracted by yourself, as the source of my sufferings. Under the skilful treatment of Mr. Hogg, the sight of my eye has been and is gradually improving; but there are one or two points, which although doubtless well understood by ophthalmic surgeons, have seemed to me very curious.

"I observed that while, by the improvement of the sight of the affected eye

I was enabled dimly to distinguish the furniture and windows of a room—the fire, which I should have thought would have been the clearest object of all, was quite invisible, and simply conveyed the impression of a black space. While this was the case, I could nevertheless faintly distinguish the smoke ascending the chimney. As the vision continued to improve, I was gradually enabled to see the light proceeding from the fire—although the absolute heated coals and flame were still invisible to me. These, together with gas-lights and the flames of candles, are now becoming distinguishable.

"I may further observe, that on closing the eye, while it was yet all but insensible to external objects, I could see various beautiful patterns, consisting of numerous combinations of gold or orange-coloured carved lines on a dark ground.

"As the sight gradually improved, these patterns became replaced by stars of a like colour on a similar dark ground—and finally both patterns and stars disappeared."—*Ranking's Abstract*, vol. xxxvii., from *Dental Review*, January, 1863.

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36. *Amaurosis following Parturition.*—Dr. Eastlake communicated to the Obstetrical Society of London (April 1, 1863) a case of this. This phenomenon had occurred on seven previous occasions under the same conditions, but it did not appear after the first labour. The patient was married, and thirty-four years of age. The blindness, which was total, occurred in both eyes suddenly about the third day after the birth of each child, and lasted on an average from three to five weeks. The patient had never lost more than the normal quantity of blood; she had never taken ergot; there was no suppression of the milk or lochia, nor was the urine albuminous. A careful ophthalmoscopic examination had been instituted, but the evidence adduced was entirely negative. Dr. Eastlake regarded the case as unique, and concluded his paper by stating that the only author who had described any case at all similar was Beer, in his "Lehre der Augenkrankheiten."—*Lancet*, May 30, 1863.

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37. *Amaurosis following Tobacco-smoking.*—M. Sichel observes, that among cerebral amauroses there are two forms but little known. One of these observed in drinkers, he himself described as symptomatic of delirium tremens several years ago. The other, due to the use of tobacco, and first indicated by Mackenzie, he once doubted the existence of. Subsequent experience has, however, convinced him of its reality, so much so that he is now of opinion that there are few persons who have smoked during a long period more than five drachms of tobacco per diem, without having their vision and frequently their memory enfeebled. Both these forms of amaurosis are characterized by the absence of well-marked symptoms of cerebral congestion, the symptoms vibrating between those of sthenic and asthenic amaurosis, and the surgeon remaining in uncertainty as to their seat and nature until the special cause is discovered. The ophthalmoscopic symptoms, as in most old cerebral amauroses, are negative or slight, and common to other cerebral amauroses. These two forms of amaurosis, like all affections dependent upon an inveterate habit, are very refractory to treatment. Generally, the two forms are observed separately, but it is not rare to find them united, and it then becomes difficult to assign the respective shares to the alcohol and tobacco in the production of the amaurosis. M. Sichel relates an interesting instance of this combination, remarkable for yielding in so short a period as six weeks, while from three to twelve months are usually required to effect amelioration in these cases. In treating them, discontinuance or diminution of the habit is a great and a difficult desideratum. Depletion, even local, should be employed with the greatest caution; and stimulating liniments or flying blisters may aggravate the symptoms. A purgative, consisting of equal parts of magnesia and cream of tartar, is an excellent means when the function of the stomach is active, alternating it with pills of gum ammoniac and aloes; but in the disordered stomach of drinkers, small doses of rhubarb and magnesia, given twice a day, one hour before meals, form a good corrective. Bathing the eyes and forehead with cold water, irritant pediluvia, and dry cupping or flying sinapisms applied to the extremities, are

excellent adjuvants. In M. Sichel's case, an ointment composed of one part of the black oxide of copper, and ten parts of lard, was applied to the temples, and was succeeded by flying blisters. M. Mercier, in corroboration of the unsuspected effects of tobacco in generating disease, related a case in which a cough, which had persisted for a year, and purpura, which had lasted for seven months, soon yielded after the cessation of smoking, which had been excessive. His own practice has furnished him with full proof of the depressing effect of this agent upon the generative functions.—*Brit. and For. Chir. Rev.*, July, 1863, from *L'Union Médicale*, No. 54.

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38. *Action of Calabar Bean on the Iris.*—In our previous number (p. 265), we noticed some very interesting observations relative to the action of the calabar bean on the iris, and we are now enabled to present some further investigations with this substance.

Dr. GEORGE HARLEY read (June 9th, 1863) before the Royal Medical and Chirurgical Society, a paper on the subject.

The following are his conclusions: 1. The ordeal bean may cause contraction of the pupil when taken internally as well as when applied locally. 2. That atropia and the calabar bean are physiologically antagonistic. 3. That the ordeal bean paralyzes the motor nerves, and leaves the intelligence and muscular irritability unimpaired. 4. That it excites the salivary and lachrymal secretions. 5. That it destroys life by paralyzing the nerves supplying the respiratory muscles—being, in fact, a respiratory poison. 6. Although it may weaken the heart's power, it neither stops the circulation nor arrests the heart's action. It is not, in fact, a cardiac poison. 7. It is closely allied in its effects to woorara and conia, most closely, perhaps, to the latter; but it differs from both in its tendency to produce muscular twitchings, and in its power of inducing contraction of the pupil. Neither woorara nor conia exert generally or locally any such effect on the iris. 8. The ordeal bean will prove a most valuable addition to the pharmacopœia, by not only giving us a useful myopic, but also a powerful anodyne, capable of soothing nerve-irritation without either destroying intelligence or endangering life by arresting the heart's action.

Mr. SOELBERG WELLS was somewhat surprised that, in enumerating the peculiar properties of the calabar bean, Dr. Harley had not called more attention to its singular power of causing contraction of the ciliary muscle, and thus affecting the accommodation of the eye, as this was of far greater importance than its action upon the pupil. The impairment of vision which follows the application of atropia is not due to the dilatation of the pupil, but to the paralysis of the accommodation. This is proved by the fact, that if we employ a sufficiently weak solution of atropia, so that the constrictor pupillæ alone, and not the ciliary muscle also, is paralyzed, vision will be but very slightly impaired. Now the calabar bean possesses the peculiar power of not only causing contraction of the pupil, but also of the ciliary muscle, thus changing the normal into a short-sighted eye. It also counteracts the paralyzing effects of atropia upon these muscular structures. In a case of rheumatic paralysis of the constrictor pupillæ and of the accommodation (ciliary muscle) of the eye, which he (Mr. Wells) published in the *Medical Times and Gazette* a few weeks ago, the action of the calabar bean was fully illustrated, and its power of causing contraction of the paralyzed parts traced step by step. With reference to this case, he might state that it was now all but cured, the pupil having almost regained its normal size, and vision being nearly perfect. He would not, however, attribute too much of this good result to the effect of the calabar bean, as it was well known that such cases of paralysis of the pupil and the accommodation, more particularly when they occurred after severe illness, often got well of themselves when the patient's health improved. He, however, believed that in this case the calabar bean considerably accelerated the cure. With respect to the local action of the bean, he might remark, that Professor Czermak and he had been trying its effect upon the eyes of rabbits, directly after decapitation, and that they had found that it produced marked contraction of the pupil within about twenty minutes of its application. He was, however, still engaged upon these experiments, and had hoped to have concluded them before the reading of Dr.

Harley's paper before this Society, which he had not expected until the next meeting.

Mr. J. W. Hulke communicated briefly the results of three experiments which had been made with the alcoholic extract of the bean on patients under his care at the Royal London Ophthalmic Hospital, by Mr. Workman, the House-Surgeon. The first patient, a sailor, had paralysis of both third (cranial) nerves, and mydriasis from syphilitic periorbitis. Two hours after the application of the extract to the right eye, the nearest point of distinct vision was sixteen and a half inches, and the diameter of the pupil was one line, the proximate point having been previously twenty-six inches, and the pupil two and a half lines broad. In the same time the near point of the left eye had become twelve and a half instead of twenty inches, and the pupil one line instead of three lines across. The second patient had paralysis of the left third cranial nerve, with mydriasis, of four years' duration, the consequence of traumatic periorbitis with abscess. In one hour the proximate point had become six instead of eight and a half inches, and the pupil had contracted from three to three-quarters of a line. In the other unaffected eye the application of the extract effected in the same time an alteration of the proximate point from eight and a half to four inches, and reduced the pupil from one and a half to three-quarters of a line. The third was a case of paralysis of the left third cranial nerve, with mydriasis from periorbitis, possibly rheumatic, which had been twice previously cured with iodide of potassium. In an hour the proximate point of distinct vision was brought from ten to five inches, and the pupil changed from three to three-quarters of a line in diameter. Mr. Hulke thought these cases confirmed generally the statement of Dr. Robertson, who was entitled to great credit from his practical inquiry into the physiological action of the bean on the eye.—*Med. Times and Gaz.*, June 20th, 1863.

These results are also confirmed by M. Giraldes, Professor agrégé of the Medical Faculty of Paris, who has communicated to the Academy of Sciences and Academy of Medicine the results of his experimental investigations. The results of his experiments he states (*Bull. Gén. de Thérapeutique*, July 15, 1863), to be as follows:—

"On eight children, of the ages of three, four, six, twelve, and thirteen, whose pupils were normal, one drop of a solution of the extract of glycerine, placed under the eyelids with a fine brush, caused evident contraction of the iris in a few minutes; the pupils were sensibly diminished; in from fifteen to twenty minutes this contraction had reached the maximum, and the pupils had scarcely the diameter of half a millimetre (about one-fifth of a line). In several of these children the pupil had been dilated that morning by atropia, and this dilatation was complete at the time of the experiment (with calabar bean); twenty minutes afterwards the size of the pupil was reduced to the minimum. These observations were confirmed by my colleagues, MM. Roger and Debout, and by M. Reveil, Pharmacien in Chief to the Hospital, as well as by all those gentlemen who attend the wards. Twenty-four hours afterwards the contracted pupil had resumed its previous state.

"The power of producing contraction of the pupil possessed by this substance does certainly afford an application of advantage in many affections of the eye. I have confined myself, in the meantime, to these particulars, purposing to continue my investigations on this important subject."

Dr. Graefe, of Berlin, has also experimented with preparations of the Calabar bean sent to him by Mr. Soelberg Wells, and his results agree entirely with those that have been arrived at by the English observers, and add some new facts to those already established. The effect upon the sphincter pupillæ and the ciliary muscle came on in fourteen minutes if the weak, and twelve if the strong extract was administered; it lasted for two days with the former, and for three with the latter. The maximum of myosis lasts from six to eighteen hours. Another effect is a peculiar change of the faculty of accommodation, which sometimes begins simultaneously with, or a few minutes after, myosis has set in. The chief feature of this is an increase of the state of refraction, which may be expressed by the dioptric effect of a lens from $\frac{1}{50}$th to $\frac{1}{8}$th. At the same time the near point of the eye is nearer than usual. This change of refraction

reaches its maximum about ten minutes after the administration of the bean, and remains so from ten to twenty minutes. After three-quarters of an hour the normal state of refraction is very nearly re-established. It is therefore a true spasm of accommodation, and in this respect Calabar bean is the direct antagonist of atropia. There are other disturbances of optic sensibility, such as macropy, but the ophthalmoscope does not show any disturbances in the circulation of blood in the retina. The effect of the bean upon the ciliary muscle is quite independent from that upon the iris, as in a patient who is deprived of the iris, but is able to see, the effect became just as apparent as in others. The drug acts by penetrating into the anterior camera, and has therefore an isolated action upon the eye, just as atropia; it excites directly the motor nerve-fibres which animate the ciliary muscle and the sphincter pupillæ. In birds, on which atropia has no action, Calabar bean is likewise nearly ineffectual; the same may be said of fishes and amphibia. The only drug which possesses some analogy to the bean is opium.

Dr. Von Graefe also made experiments with Calabar bean after having first administered a solution of atropia. If the dose of the latter has been strong, the effect of the former may be entirely counteracted. But if some time has elapsed after the use of atropia, or if the dose given was weak, the pupil is moderately contracted, and there is a considerable increase of the state of refraction. Atropia acts far longer upon the apparatus of accommodation than Calabar bean; and it may therefore happen that after the effect of the latter has passed off, that of the former may again become apparent. In mydriasis the bean has the same effect as in healthy eyes; and even in glaucoma this may be observed, unless the iris should have already become quite atrophied. In fistula of the anterior camera the effect is far less marked, but not entirely counterbalanced.—*Med. Times and Gazette*, Aug. 22, 1863.

MIDWIFERY.

39. *Artificial Induction of Premature Labour.*—Prof. MARTIN'S cases forming the subject of a paper in *Monat. f. Geb.* (Jan. and Feb. 1862), were twenty-two in number. In three instances the operation was performed twice in the same individual. Five women were primiparæ, the rest multiparæ. Contraction of some part of the parturient canal was present in twenty cases, in nineteen of which the pelvis was the part contracted. In all these labour cases the antero-posterior diameter was shortened, and in several of them the oblique diameters also. With reference to the indications for the induction of artificial premature labour, the author considers that general pelvic contraction, whether with or without accompanying contraction of one diameter specially, certainly indicates its necessity; but in cases when the contraction is limited to one diameter, unless the degree of the same be very considerable, it is advisable to wait the result of the first labour. It has been found that in some cases, where the antero-posterior diameter has not exceeded $2\frac{3}{4}''$, the result has been successful for mother and child when matters have taken their own course. This may be explained by—1, the smallness of the children and the soft condition of the bones of the first children of rachitic mothers; 2, the powerful nature of the labour-pains in the first labours of such women; 3, by the fact that the oblique diameters being often greatly increased in such cases, room is thereby given for the head to pass through, with its shortest diameter opposed to the part of the pelvis, when the contraction is greatest. On the other hand, in the subsequent labours of rachitic women with such moderate degrees of pelvic narrowing;—1 the size of the fœtus appears to increase in successive pregnancies; 2, the, configuration of the lower part of the uterus is less regular and favourable for the long progress of the labour, in consequence of the pressure it has undergone in former labours between the head of the child and the pelvic bones, and hence the position of the fœtus is not so good; 3, the pains are less regular in sub-

sequent pregnancies. It is difficult to say what precise measurements of the pelvis indicate, or not, the operation. Much depends on the form of the pelvic inlet, whether the projection forwards be in the middle line or not, and on the manner in which the head presents at the inlet. Indications for the operation are also conditions threatening the life of the mother—uterine hemorrhage, placenta prævia, &c. Two instances coming under this head are given, in which there was excessive distension of the uterus with fluid (hydramnios), œdematous swelling without albuminuria, loss of appetite, and insomnia, and in which the operation was had recourse to. A third series of indications have been laid down by various authors, viz., the habitual death of the fœtus in the last months of pregnancy. The only condition with which the author is familiar at present under such circumstances is a dropsical state of the fœtus, with evident affection of the blood-corpuscles, and these have been constantly observed in cases where there is constitutional syphilis in the parents. The proper treatment in such cases is an anti-syphilitic one, and not induction of premature labour.

The period of pregnancy at which the operation was undertaken was as follows: In two cases at the thirtieth week; in one case of extreme pelvic deformity at the thirty-second week; in one case at the same period, when there was a firm, unyielding tumour of the sacrum. Four of these children lived. In five cases labour was induced at the thirty-fourth week, and three of the children lived. In ten cases at the thirty-fifth week; two of the children were still-born, the others lived. The presentations were—in the seventeen cases, cephalic; in four the feet presented; in three cases, position transverse; in two cases there was prolapsus of funis.

The method employed was to select the simplest at first, and this failing to induce uterine action, to have recourse to other more powerful measures. Sucking the breasts by means of an India-rubber apparatus was employed, but with very little result, in three cases. It was never alone sufficient. The colpeurynter was employed in two cases, once after sucking had been tried; in the other case, after fourteen fruitless injections of aqua picea into the uterine cavity. The vaginal douche was employed in twelve cases; only twice did it alone succeed, and three times it was necessary to employ a sponge to dilate the os; in one case it induced hemorrhage. Sponge tents were employed in four cases, always after the vaginal douche had been tried. Active pains and dilatations of os set in in all cases not later than twenty-eight hours after its introduction. Warm water was injected into the uterus, between it and the membranes, in four cases. In the first two the results were satisfactory, but in the other two they were such as to lead the author not to employ this method further. He thinks it not impossible that hemorrhage may be produced by repeated injections after this method, and that air may possibly be introduced. In ten cases the means employed to induce labour was the introduction of a gum-elastic catheter into the uterus. In six of these cases the vaginal douche had been previously employed. In eight cases the interval which elapsed between the introduction of the catheter and the first pains was five minutes to twelve hours. In five of the cases, the pains not being satisfactory during this interval, a second, larger catheter was also introduced. The birth of the children took place in twelve to fifty-two hours; six were born alive; one mother died of metritis. Puncture of the membranes was employed in the two cases when hydramnios was present; both had a favourable result for the mother. The general result arrived at is that the best time for the operation is the thirty-fourth or thirty-fifth week, and that the best method consists in the use of the vaginal douche of warm water, this being followed by catheterization of the uterus.—*Sydenham Society's Year Book* for 1862.

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40. *Anæsthetics in Midwifery.*—Dr. Charles Kidd read a paper on this subject before the Obstetrical Society of London (May 6, 1863). The administration of chloroform, he said, in various kinds of labour has been followed by the very best results; the feeling of hope of relief of pain to the mother continues to be most beneficial, the increasing number of living children now saved, where craniotomy previously was practised, is most encouraging for the future. The

present communication is a sequel to a former one in the *Transactions* of the Society, and the author said it was satisfactory to find that all the leading details of that memoir had been highly appreciated, and since then very fully recognized as to their truth by the chief practical obstetricians of Germany, France, America, Australia, etc., more particularly as to the extreme value of chloroform in cases of malpresentation, or contracted outlet of the pelvis requiring versional delivery; as also in some bad forms of anæmic and epileptic puerperal convulsions, chloroform in tedious exhausting labours after dilatation of the os in women of a "particular age" who marry late in life, etc. etc. The present communication in particular had reference—1. To cases attended with hemorrhage, where the author wished to suggest caution in the administration, as also to obtain the opinion of the Society if hemorrhage be encouraged by chloroform. 2. To direct attention to the serviceableness of chloroform in cases of retained placenta. 3. To the usefulness of alternating the administration of ether with that of chloroform where the pulse sinks, as in some exhausting operations, such as ovariotomy. 4. To the vast advantage of using chloroform in puerperal convulsions. 5. To direct attention to the greater safety of chloroform at present, as we now know the accidents do not occur so much or at all from heart disease as from simple apnœa, as the result of stoppage of the respiratory muscles, like the relaxation or paralysis of other muscles, and to direct the Profession to the extreme value of the "Faradisation" current of these muscles in such accidents, when other means fail to restore the patient. And, first, as to the tendency of chloroform to superinduce hemorrhage in ordinary cases, the author seemed to think the fear of this was not entirely without foundation: it is, perhaps, the only one vulnerable point in the administration, yet the latter can be stopped if hemorrhage is feared or the hemorrhage combated by ergot, stimulants, the use of cold, the "binder," pressure, etc., but according as bleeding continues, it is to be remembered the absorption or endosmosis of the chloroform is slightly increased, if it be still gone on with; though, on the whole, the author is not so much afraid of this condition with chloroform as one of brain congestion, or a state observed occasionally—viz., almost of delirium tremens—in some Hospital patients, or a state leading to the actual effusion in the brain in the worst form of puerperal convulsions; but this latter disease may occur without chloroform at all, and we must not blame chloroform. The author desired it to be known that he now took the most unfavourable as well as the more favourable side of the question, and as a "set off" to the doubtful question of danger of hemorrhage, he was certain that chloroform removed unnecessary and often exhausting pain (for pain, *per se*, is always an evil); it renders "versional" delivery very much more easy, it also undoubtedly facilitates the recovery of the lying-in patient; it lessens pain, which pain often leads to puerperal convulsions. It is not probable at all that chloroform skilfully used ever stops a labour or causes inertia. Dr. Tyler Smith saw one case—we see this stoppage, and inertia, and even many cases of death from syncope during, or immediately after labour, where chloroform was never thought of at all; nor does it cause inflammation. We must not argue from coincidences, or false statistics, or what the author terms it, the always venerable error in medical logic of arguing from a "post hoc" to a "propter hoc;" it is a great charity to give the women in childbirth chloroform; but it too often happens that statistics, old routine, and shallow incongruities, as in other kinds of medical evidence, stand in the way of what is of charity or the general good of the poor patient, or the professional character. The next division of the present paper had reference to the usefulness of chloroform in "hour-glass" contraction of the uterus, and some, if not all, cases of retained placenta. A safe and useful rule (having the approval of the large Dublin Lying-in Hospital and other institutions) is the following: If, in efforts at manual extraction of adherent placenta, the uterus be contracted firmly or in "hour-glass" fashion, the condition of the patient fair, and yet much resistance offered to the hand—but we are anxious to avoid uterine phlebitis—the administration of chloroform facilitates the placenta removal and changes the firm uterus contraction (as in version cases). It is, of course probable in many cases that there may be prostration or inertia; here ammonia must be given, and acts very well with chloroform or brandy. There

is a sort of lying-in room superstition, need it be said, that nothing is right till the placenta and every bit of a placenta is taken away. No doubt retained placenta is fortunately a rare complication in cases of delivery, yet in some 6000 deliveries, 56 of bad hemorrhage and 28 of retained placenta were noted, and one case was mentioned by the author where "portions" of a placenta were removed, and uterine phlebitis thus prevented, twelve hours after a delivery; the removal such as seemed impossible without chloroform. These cases are more common with first children than with post-primiparous births. Chloroform is at least one remedy not to be neglected when the other ordinary measures are under trial. Whether many of these cases depend on inertia, the reader will decide for himself; but a new and better school of obstetrics has arisen within the last dozen years, and since the introduction of anæsthetics, bleeding is not now the remedy for phlebitis or typhus; nor is chloroform so full of danger as supposed or shown by false statistics. The author here related his experience in the analogous depressing operation of ovariotomy, in about thirty of which cases he has assisted with the anæsthetic. He now prefers ether to chloroform, or, better still, to place the patient first fairly under the latter, and continue the anæsthesia with the former; it is not necessary to use very much of ether, but if the pulse should sink, the action of sulphuric ether is very marked in restoring it. If ovariotomy could be performed without one or the other, but with a piece of ice over the linea alba, it might be better still. The chief portions of the operation—breaking down adhesions where they exist, securing the pedicle, etc.—are not very painful, and even the tension of the tumour sometimes stretches the abdominal wall to a thin membrane, devoid of feeling. Chloroform, the author again intimates, should be never given in labour cases before the os uteri has dilated to something like the size of a shilling; before that the woman will bear her "pains" with some philosophy or satisfaction, if not resignation. The narcotism of chloroform is more marked in the early than in the later portion of the labour; but it is here that chloroform "delays a labour," as occasionally complained of. It is a great mistake to begin it too soon, however, no matter what the entreaties of friends, or attendants, or the patient herself may be. Very many of the popular prejudices against chloroform in these cases arise from catching a fact by the wrong handle, as it were, or losing sight of the "Opiferque per orbem" that we boast, the relief from pain in charity that it is our duty and privilege to afford the lying-in woman. Pain, too, is a physiological evil; the sense of pain is confined to the sensorium and sensory ganglia, in which chloroform acts so specially and almost alone. The effort of the uterus to empty itself, on the contrary, is one so little related to these that labour may go on in perfect paraplegia; as in cases where the relations of the spinal and reflex system were totally cut off from the sensorium and ganglia by acephalocysts in the upper portion of the chord. Labour, again, will proceed, though the cervical vertebræ may have been fractured in animals, or in the deep apoplectic coma of eclampsia in women, or in the dead insensibility of drunkenness, all of which explains that pain is non-essential, and that we may have spontaneous uterine or reflex action very perfect indeed, though sensation of pain through the brain be removed. At any rate, the sense of pain as pain, as the woman is aware of all about her, and even of the contractions or rhythm of the uterus, as she might without pain recognize the rhythmic contractions or beat of the heart. She watches, in fact, for the "pain," as she calls it; wonders and reflects that it has lost its agony, and yet the labour progresses as well as if she was in torture; recalling one's rude recollection of the old lines—

> "Remembrance and reflection—how allied;
> What thin partitions sense and thought divide!"

Like the knights of old, and their contending opinions of the colour of opposite sides of the same shield, have been the contending opinions in journals and books as to whether chloroform is dangerous in labour, or delays labour, or leads to hemorrhage. But this diversity is at once explained as to delay—whether the chloroform was given too soon or not; and as to danger, by a heap of errors yet copied from one standard edition of a book into others, as to heart disease and its dangers, etc. Reference was next made to "Puerperal Convulsions,"

and three cases mentioned of fatal puerperal convulsions brought on apparently by the excessive reflex irritability of passing the hand into the uterus to remove adherent placenta. Both affections might have been prevented by use of chloroform, but could not fail to be aggravated by the lancet, still so much esteemed in convulsions. But the day for the lancet is gone by, as for stage coaches, or salivation in syphilis. Again, such convulsions are often the result of intense, long-continued agony, which nothing can lessen so well as skilful and small doses of chloroform. It is probable, as observed by Van der Kolk, that in these and all such cases of convulsions that direct irritation of peripheral ends of nerves (notably in some forms of fits from worms, irritation of external genitals in masturbation, etc.,) is reflected directly back to the medulla oblongata (or cerebellum (?) which probably presides over the organs of involuntary life), much like the impression of molecules of a galvanic telegraph wire, though still purely vital; this direct irritation, by a sort of induction, acting on other roots of nerves lying side by side. Hence we see that passing a hand into the uterus excites convulsions in parts not apparently connected with the uterus, but all which excess of action, as well pointed out by Dr. Tyler Smith, Dr. Murphy, and others, is controlled, for a time at least, by chloroform. We see this every month in tetanus cases also, and various forms of epilepsy as now so admirably cured by Dr. Brown-Séquard by other forms of anæsthesia. In conclusion, the author directed attention to seventeen women with obstructed labour, where the mothers had had in old times previously dead children, or eviscerated children, torn away by hook or crochet, or craniotomy, as related to the Society, but where, by means of version subsequently under chloroform, nine living children, and seven with heart pulsation (but which did not live), were gained for the overjoyed mothers, and the barbarous misery to patient and attendant of pulling the child in pieces or craniotomy saved. Cases of this kind now crowd on us from all parts of Europe, America, Australia. Such is one of the vast benefits of this still underrated and cruelly misrepresented agent, chloroform, which now, as we are aware of the exact nature of accidents, not from heart disease, as previously surmised, has come to be perfectly safe, as simple apnœa of chloroform (cardiac syncope of snow) is due to diminished action of the respiratory muscles and general reflex system, so readily excited by electricity when ordinary means (which is not often) fail to restore the patient.

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41. *Apnœa Neonatorum.*—Dr. GEORGE GREAVES, in a paper in the *British Med. Journal* (July 5th and 12th, 1862), endeavours to reduce into a consistent theory the facts relating to the condition of the vital functions of the fœtus during labour, and of the new-born child in the interval which occurs between birth and the full establishment of respiration. This question has not, he contends, received the attention it deserves. The subject is commenced by a reference to the state of infants apparently stillborn. Of these there are three classes: 1. The surface of the child is pale, the body is motionless, the pulsation of the funis has entirely ceased, the beating of the heart can scarcely be felt; this is syncope. 2. The external phenomena are the same, but there is still some pulsation in the cord, though it is weak and slow; this is apnœa. 3. The pulsation of the cord is not necessarily slow, may be strong, the surface is rather blue than pale; the face and neck are livid and swollen; the eyes are often widely open. This is a partially apoplectic or comatose condition. The two first classes of cases are the same in kind, only differing in degree, and they depend on one cause, namely, the more or less prolonged interruption to intercommunion between the organisms of the mother and the fœtus; but in the third class of cases the condition is essentially different, there have been incomplete attempts at respiration, and the phenomena of congestive apoplexy are present. The consequences produced by interruption to the placental action on the fœtus are two, the fœtus is deprived of food and also of air. The effects of the deprivation of the latter only it is necessary to consider. This suspension of the breathing function of the placenta may be effected: 1. By the blood of the mother not being sufficiently arterialized. 2. By great loss of blood or other cause producing syncope in mother, whereby the quantity of blood sent

to the placenta is materially diminished. 3. By interruption to the circulation through the umbilical cord. This most frequently occurs during labour; but it may occur prior to this and from other causes: knotting of the cord, or knotting round a limb, or round the neck; extensive œdema of the cord; twisting of the cord on itself; these causes also may produce the effect alluded to. 4. There is a class of cases in which there is interruption to the breathing function of the placenta owing to contractions of the uterus during labour. This is intermittent in its action, and does not usually go beyond a lowering of the vital activity, and a weakening and retardation of the pulse of the fœtus while the cause is in operation. This class of cases the author wishes to direct special attention to. He states that it has been found by many observers that there is during labour a retardation of the fœtal pulse, and he substantiates this by reference to the works of Hamilton, Kennedy, Moir, and Sidey. The diminution of the frequency of the fœtal pulse during the pains of labour, to the extent of a third or even of one half, may, he presumes, be accepted as an ascertained fact. What is the cause of this retardation? "It will be at once admitted that it is a cause which, operating with more than ordinary force, must be the chief agent in producing still-birth." It has been the custom to ascribe the still-birth, when not manifestly dependent on immaturity or disease of the fœtus, to pressure of the uterus on the fœtus. It has been assumed that this pressure is exercised on the chest or head: it is difficult to conceive, however, how this can be the case. Compression of the placenta between the body of the child and the placenta has also been set down as a cause. This may be the case, but only as subsidiary to one which is, the author believes, the main agent in producing the effect in question, viz., the obstruction by the contraction of the uterine fibres of the flow of blood through the ultimate ramifications of the uterine blood-vessels, the "curling arteries." The temporary stoppage of the circulation in the vessels here alluded to has not been spoken of by any previous writer. The blood in the fœtal vessels cannot be duly aerated if the blood sent to the placenta be greatly diminished, and as a consequence of this it stagnates. The fœtal heart beats more and more weakly, and less frequently, and finally ceases unless the obstruction to the placental circulation be removed. The heart of the fœtus ceases to act from over-distension. In the early stage of labour the pains occur with long intervals, there is consequently ample time for the placenta to recover itself; if the labour be very rapid, and intervals of rest be not afforded, the child is born apparently or really inanimate. In a more advanced stage of labour, when the liquor amnii is discharged another cause comes into operation, the placenta becomes actually partly detached, and the connection between the placenta and the uterine arteries is in places permanently broken; in cases of placenta prævia this event occurs at the commencement of labour and in a large proportion of such cases the child is stillborn. The cause now pointed out by the author is in operation in every labour. To the possible objection to the position here taken up, that the circulation in the cord cannot be suspended, inasmuch as the cord still continues to pulsate, the author answers that pulsation is not necessarily a sign of the passage of blood; the cord pulsates after it has been tied between the ligature and the heart. Compression of the placenta generally, may intensify the action here alluded to, but in a secondary manner. After labour has begun, the funis may be compressed and extended from well known causes. The action of the uterus may be thereby intensified, and the uterine arteries more and more compressed as above described. Compression of the head has possibly its share in producing still-birth in tedious labour from contracted pelvis, but this cannot be the case in still-birth with unusually rapid labour. A further effect of stoppage of placental circulation is that the entry of blood from the placenta to the fœtus is prevented, and what arrives is impure and devoid of vitalizing properties. When the apoplectic form of still-birth is present, the phenomena are different; the pulmonary organs have been partially expanded, the pressure on the column of blood in the ductus arteriosus has been relieved to a certain extent, while the foramen ovale has become partially closed. On this respiration process being interrupted, however, the right heart becomes congested, hence the lividity, swollen features, &c. The alleged effects of secale cornutum are explained by

what has been here related of the effects of rapid labour. It is fatal to the child when it gives rise to permanent unresting uterine contractions, unless we admit, at least, the directly poisonous influence of the drug on the fœtus.

The practical conclusions drawn are: It is perfectly useless to delay tying the cord after the expulsation of the child; more, it is injurious by interfering with efforts at resuscitation. In attempts to resuscitate a still-born child, the first thing which should be done is to allow of the escape of a minute quantity of blood from the cord, thus to relieve that distension of the heart which prevents its action. If after a pause of two or three minutes the child does not breathe, and is not really and manifestly asthenic from prematurity, disease, &c., the cord should be divided, and one to three drachms of blood allowed to escape. In apoplectic cases the quantity removed may be greater. The next step is to induce respiration. The warm bath is, the author believes, injurious; dashing cold water on the chest, slapping the back or nates with the hand, circular friction on the epigastrium with the tips of the fingers are all useful. These rarely fail if the heart still beats. The direct inflation of the chest with air is preferred to the "ready method" should the above measures fail.—*Sydenham Society's Year Book* for 1862.

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42. *Simultaneous Uterine and Extra-Uterine Gestation Proceeding to the full Term of Gestation.*—Mr. L. R. COOKE read before the Obstetrical Society of London, June 3, 1863) the following account of a case of this.

E. R——, aged thirty-nine years, who had had three previous natural deliveries, was taken in labour on December 8th, 1862. She had suffered no very unusual amount of inconvenience during her pregnancy beyond dragging pains, and an unusual sense of weight in the abdomen. On external examination, the abdominal swelling was found to differ from its normal characteristics, in having its greatest prominence considerably to the left side, and about on a level with the umbilicus; the whole tumour being also more circumscribed, well defined, and spherical in form than usual. The limbs of a fœtus were distinctly traceable through the abdominal walls, and a placental souffle was audible over a large portion of the tumour. A vaginal examination showed the canal much elongated, its rugæ obliterated, and the os uteri drawn up beyond reach of the fingers. Suspecting therefore an abnormal gestation, Mr. Cooke requested Mr. Spencer Wells to see the patient with him, and he attended with Dr. Kuman, of Vienna. It was thought there were two sets of fœtal heart sounds, while the extensive surface over which the placental bruit was heard gave a suspicion of two placentæ. Whether the fœtuses were both intra-uterine, or an ovarian tumour present also, was uncertain. At this time the pains were so slight and at such long intervals, that the patient was left, the bladder having been emptied, and a grain of opium administered, instructions being given to send for Mr. Cooke on the occurrence of expulsive pains or of any change in the patient.

She passed a good night, and the uterine pains had been gradually re-established during the next day. At six o'clock P. M. Mr. Cooke was sent for, and found her in strong labour. Making an immediate examination, the sacral concavity was now found occupied by a firm, resisting, rounded tumour, presenting no trace of fluctuation, and immovable under a very considerable degree of force employed between the pains. Its presence reduced the outer posterior dimension of the inlet to less than two fingers' breadth, through which no os uteri was discoverable; but resting on and anterior to the symphysis pubis, a small portion of the convex cranial surface of a fœtus was to be felt.

Dr. Greenhalgh and Mr. Meates, of Chester-square, saw the patient. The diagnosis was still a matter of doubt, because the tumour was not traceable abdominally, the uterus being in front more or less; and examined per vaginam, it might equally have been taken for a solid tumour or a pedunculated fibrous outgrowth from the uterus.

The obvious indication was to deliver the woman as speedily as possible, as the severity and frequency of the pain threatened rapid exhaustion of her strength, if not rupture of the uterus. Perforation of the head of the fœtus was considered inadmissible from the almost impossibility of getting at it and

fixing it, and because also, even supposing it accomplished, evisceration and dismemberment under the same difficulties would have been equally necessary.

It was decided therefore to put the patient under chloroform, so as to suspend the action of the abdominal muscles, in order to endeavour to displace the tumour and turn the child; and failing that, to perform Cæsarean section. This being done, the tumour was pushed out of the vagina with some difficulty, and delivery completed by version. The placenta being removed, and the uterus not contracting satisfactorily, the woman moreover being much exhausted, it was thought advisable to avoid any manipulation of the abdomen with a view to discover the nature of the remaining tumour. She never entirely rallied from the shock and exhaustion from the operation, and died within forty-eight hours.

The autopsy was made four hours after death, Dr. Greenhalgh, Dr. Kuman, Mr. Spencer Wells, Mr. Meates, Mr. Colborne, and Mr. R. L. Cooke being present. On opening the abdomen and reflecting the walls, the first thing revealed was the body of a full-grown female fœtus contained in its proper membranes, which was unruptured, and distended with liquor amnii. The anterior or external surface of the chorion was perfectly smooth, and in immediate relation with the abdominal peritoneum. Beneath the tumour the uterus was seen, partially contracted and unruptured. There was a large quantity of greenish-brown, grumous fluid in the peritoneal cavity. On opening the fœtal membranes and removing the fœtus, it was found that the placenta was situated in, and firmly attached to, a shallow capsule, formed of the expanded and enlarged fimbriæ of the right Fallopian tube, which on its convex or peritoneal aspect was firmly tied down by numerous and very tough bands of old adhesion. A stylet could be passed along the tube to its expanded extremity, when it became arrested by the placenta.

The author remarked, that the lessons derivable from this case appear to be mainly—

1. That in cases of doubtful tumours complicating parturition, it may be well to discover, as far as may be, whether there is any evidence of an extra-uterine fœtation as soon as possible after uterine delivery.

2. Whether, in case of such a discovery, the probability is or is not that the adhesions of the tumours may be so firm and numerous as to render gastrotomy inadmissible.

3. Whether, supposing the existence of such adhesions to be admitted, it is advisable or justifiable to remove the fœtus alone with the certainty of a portion of the liquor amnii escaping into the peritoneal cavity, and with the possibility of the placenta becoming encysted and being thrown off at a future period.

Dr. Greenhalgh remarked that the case so ably narrated by Mr. Cooke was most interesting in a diagnostic and practical point of view, and he believed was without parallel in the annals of obstetric medicine. He drew attention to the remarkable absence of abnormal symptoms during pregnancy, to the extreme anteversion of the womb, and to the influence of the labour pains in forcing the extra-uterine fœtus from its position in the abdomen into the pelvis, and so occasioning an obstacle to the passage of the intra-uterine fœtus.—*Lancet*, July 11, 1863.

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43. *Extra-Uterine Pregnancy—Delivery per Anum.*—Dr. Matthews Duncan exhibited to the Medico-Chirurgical Society of Edinburgh a fœtus apparently nearly fully developed, but in an advanced stage of a peculiar decomposition, which he had delivered per anum as a breach presentation. He was indebted to Dr. Sanders for this interesting case, the woman having been transferred to his care by Dr. Sanders, under whom she was originally placed in the Royal Infirmary. The case was, in every respect, one of very great clinical interest. Dr. D. would here only observe, that although the operation appeared very formidable, and the woman appeared to be in a state of very great exhaustion and danger, yet two days after the removal of the child she wished to be allowed to leave her bed and go to the fireside, and had made a rapid recovery without a bad symptom. After the birth of the child, Dr. D. passed his hand and arm per anum into the cyst, to examine it and remove its contents. In two

days after this great distension of the anus, it had so far recovered its function, that the woman, though affected with diarrhœa, no longer soiled her bed, and after other four days the sphincter acted quite as efficiently as before the operation, gently grasping the finger passed through it.—*Edinb. Med. Journ.*, July, 1863.

MEDICAL JURISPRUDENCE AND TOXICOLOGY.

44. *Poisoning by Phosphorus.*—In the Clinical Report of the Hospital of Hamburg, for 1861, by Dr C. TÜNGE, there is a history of nineteen cases of phosphorus poisoning. In all these cases the poison was taken intentionally, for the purpose of suicide, by persons who were suffering from mental distress.

Amongst the symptoms observed in these cases, the reporter remarks that there were presented few of those usually ascribed to the effects of phosphorus. The appearances of gastro-enteritis which are commonly assumed to follow large doses were not offered, nor was there shown any indication of those signs of nervous excitement which are assumed to follow upon the administration of small doses of the poison. The first symptoms occurred a few hours after the administration, and were usually excited by the absorption of foods taken into the stomach, especially fluid foods, such as milk. The first symptoms were vomiting, pain in the stomach, and burning, but the indications of the irritation of the mucous membrane of the stomach were rarely intense, and there was seldom any action of the bowels, but more frequently constipation. In several cases, during slow recovery, jaundice was presented, which in a few days also passed away. Together with the external sign of the jaundice, there were indications of fulness in the stomach, deficient appetite, faintness, and vomiting of bile, and in severe cases præcordial pain, giddiness, noises in the ears, throbbings in the head, sleeplessness, black vomit, and evacuations from the bowels containing blood. The pulse and the animal temperature showed very little deviation. The voice, in nearly every case, was low, but this sign the writer properly considers was rather attributable to the mental condition of the sufferer than to the physical. In some instances, the patients gave evidence of delirium and coma; in others, where the cases ended fatally, there was consciousness up to the period of death. In the latter examples, the præcordial pain was most marked, and there were signs of cerebral anæmia. The action of the kidneys was irregular and difficult, the urine was acid, and rarely albuminous.

It was impossible to determine the quantity of phosphorus taken in every case, but one man took from two to three grains in an electuary, and another half a scruple in honey. The active effects of the poison seem to have been greatly increased when it was swallowed in fluids, especially in warm water and milk.

Of the nineteen cases of poisoning fourteen recovered; in the five that died, the following were the leading morbid presentations. The general fact was that the morbid signs were those of jaundice in an intense form; the liver was increased in size, free from blood, and indicated marked fatty change. The kidneys were degenerated, and their epithelial structure was destroyed; ecchymoses were observed, and the blood was fluid, as in icterus and in yellow fever; there was also molecular destruction of the muscular fibres of the heart.

In regard to treatment, emetics were found to be the most useful antidotes; and the fear of exciting gastro-enteritis, either by the use of emetics or purgatives, proved groundless. After free emesis, a purgative was valuable, but castor oil, and all oils had to be avoided, owing to the solubility of the phosphorus in them. Dr. Tüngel believes from his observations, that phosphorus does not readily oxidize in the stomach, and in none of his cases was there any indication of recent inflammation of the lining membrane. In the first stages of poisoning, calcined magnesia was useful. The paper noticed is most valuable. Its teachings extend beyond the simple question of poisoning by felonious or suicidal intent, into various questions connected with general pathology and natural disease.—*B. and F. Med.-Chir. Rev.*, April, 1863.

AMERICAN INTELLIGENCE.

ORIGINAL COMMUNICATIONS.

Case of the Intussusception of the Small Intestine; thirteen inches of the ileum separated and discharged; recovery. By A. S. BARE, M. D. Communicated by Jno. L. Atlee, M. D., in a letter to the Editor.

DEAR SIR: The report of the following remarkable case was handed to me by my friend and former pupil, A. S. Bare, M. D., of this county, which, if you deem worthy of publication, you will please give a place in the Journal.

It is one of those cases where death is almost uniformly the result; and where, most probably, the event is hastened by injudicious efforts to remove the obstruction. In this case, I have but little doubt that the successful issue is attributable to the early and correct diagnosis of Dr. Bare, and to the very judicious treatment adopted by him from the commencement. The portion of intestine discharged is now in my possession.

I am, dear sir, very respectfully yours, JNO. L. ATLEE.

LANCASTER, PA. Aug. 1, 1863.

"I was called to see Mrs. John Parmer, aged 58, on the 5th Oct. 1862, at 2 o'clock P. M. I found her labouring under the most excruciating pain, immediately below and to the right of the umbilicus. Her skin was cold and clammy, pulse thready, and 122 to the minute; tongue dry and thirst incessant. At 10 o'clock on the morning of that day, the patient had climbed a fence to gather peaches from a tree. She jumped from the fence, and, to use her own expression, felt something give way in the abdomen, causing severe pain, which continued to get worse, when I was sent for, and found her as above described. From the history of the case and the symptoms present, I believed it to be a case of intussusception of the ileum, and at once resolved, if possible, to adopt such means as in my judgment would save my patient. Believing that the obstruction existed, I studiously avoided all medicines that would increase the peristaltic motion of the intestines; gave largely of opium and morphia, and, occasionally, blue mass. By injection, I administered demulcents with laudanum. On the third day, a more stimulating injection was administered; the abdomen became distended, and a large blister was applied over it. By means of the injection, the lower bowels were evacuated. Continued the opium and blue mass. From this time to the 11th, the treatment was the same. On the 10th, air passed through the intestines, which was considerable in quantity on the 11th. I now ordered a little castor oil with laudanum, and on the 12th the bowels were opened. On the 13th, 14th, and 15th there was excessive diarrhœa, which was finally overcome by the use of acetate of lead and opium. On the 16th and 17th, supported the patient with injections of chicken broth. On the 18th a portion of intestine, about thirteen inches long, was discharged. From this time the patient gradually recovered, and now only suffers from indigestible food, when it passes the stricture."

APRIL 7, 1863.

Gunshot Fracture of the Right Orbit, and Lodgment of a Minie Ball in the Head of the Humerus. By PHILIP S. WALES, M. D., Surgeon U. S. N. —C. D., sailor, aged 18, was admitted to the hospital at Portsmouth, Va., October 5th, 1862, with a gunshot fracture of the base of the orbit and a gunshot wound of the shoulder. In an engagement with the enemy, this man was struck by two Minie balls at the same time; one impinged against the external angular process of the frontal bone, comminuting this, opening the ocular globe, passed backwards obliquely through the temporal fossa and muscle, and escaped about midway between the right ear and the eye: the other entered the right shoulder about the middle of the deltoid, and there remained. When brought into the house he was semi-comatose, the left eye was swollen and ecchymotic, and a small wound was observed upon the cheek below it, which was probably produced by falling against some projecting body after being shot. The eyelids of the right side were swollen. A bloody puriform matter escaped from his nostrils. Pulse 84; respirations 16. Was ordered: ℞.—Hyd. chlor. mit., Pulv. Jalapæ, āā gr. x. Ft. in pulv. j. Injection of a turpentine enema in the evening.

October 6. Patient in same state; breathes deeply, like one in a profound sleep, but could be aroused sufficiently to put out his tongue and give monosyllabic replies. Less swelling in the side of the face; is thirsty, and asks for water. The medicine purged him freely last night. Took a little gruel this morning. ℞.—Tr. aconite, gtt. v, every third hour. Continue cold water dressings to wounds.

8*th.* Palpebræ of the right eye ecchymotic; is asleep most of the time; pulse 84. With the probe a roughened surface could be felt in the wound of the shoulder. Same dressings.

10*th.* Wounds beginning to suppurate; dressed them with oakum; nasal discharge continues; pulse 97.

13*th.* Removed several small spiculæ of bone from the temporal wound. Continue dressings of oakum.

15*th.* Is improving a little, but still symptoms of cerebral inflammation. ℞.—Pil. hyd. gr. j; Pulv. rhei, Sodæ bicarb., āā gr. ij. Ft. in pil. No. ij, every third hour.

19*th.* Gum slightly touched; omit medicine. Is delirious this morning. Apply cold to head. Midnight. Comatose; cannot be roused by the loudest calls and most rigorous shaking. ℞.—Ol. tiglii, gtt. ij; Micæ panis, q. s. Ft. in pil. j.

20*th.* Had convulsions last night three times, each paroxysm lasting some minutes. Continue cold.

27*th.* Is sensible this morning; can converse easily; complains of much pain in wound of temple, where an abscess has formed; punctured it, with relief of the pain. The ocular membranes are much swollen upon this side, and project forwards, bulging the lids outwards as well as everting them. Continue dressing wounds with oakum.

November 8. Has been gradually improving; the head symptoms have completely disappeared. Sat up an hour.

21*st.* Sits up all day; nutritious diet.

27*th.* Punctured a small abscess upon the shoulder. There is evident paralysis of the deltoid muscle.

December 10*th.* The patient has daily improved in health and strength. The arm hangs powerless beside him. An exploration of the wound in the shoulder soon convinced me that there was a foreign body impacted into the bone. A long incision was made perpendicularly to the fibres of the del-

toid down to the head of the humerus, and, after a good deal of difficulty, I seized and removed a Minie ball deeply lodged into its cancellous structure, about a quarter of an inch below the anatomical neck. The apex projected outwards just above the level of the bone, and its conical shape, besides being imbedded in the osseous tissue, offered the greatest obstacle to its removal, for the instrument slipped every time any tractile force was used, until finally I managed to slip the two branches of the forceps between the ball and bone, and then with all the force I was capable of using with it as a lever, I extracted the mass of lead safely.

January 10. The wounds have completely healed on the shoulder, and the function of the arm perfectly restored.

To-day a part of the orbital process of the frontal bone, adjoining the external angular process, was found necrosed and causing considerable local irritation, with profuse discharge of pus from the wound on the eye.

By an incision through the outer canthus to a point an inch beyond it upon the temple, and subsequently dissecting up the superior flap a sufficient distance, I was enabled to seize the dead bone, and remove it safely. Its size was that of a ten cent piece, rounded, and concavo-convex.

30*th*. The man is now convalescent, and by the judicious use of compression, I have succeeded in remedying the eversion of the palpebral conjunctiva, and the eye will soon be in a condition for the use of an artificial one.

This case presents some interesting features in a diagnostic point of view; there were injuries of both eyes, and when the patient was sent to the hospital it was thought that there was also a gunshot wound and fracture upon the left side like that upon the right; but the distinguishing phenomena were, that, in the former case, the swelling was considerable, and the ecchymosis came on immediately, and was seated in the substance of the lids, and more superficial; while the ecchymosis in the latter case came on later, and extended gradually from the outer canthus inwards under both eyelids and conjunctiva, and there was no great amount of swelling.

From these features alone it might have been safely diagnosed "fracture of orbital plate upon right side, simple contusion upon the left." And in recollecting the anatomical fact that the palpebral ligaments pass from the orbital margin to the edge of the tarsal cartilages, thus cutting off communication between the subcutaneous and submucous cellular tissues, we can easily understand why a blow around or below the eye, as in this case, causes an effusion of blood into the loose connective tissue, taking place rapidly and largely, is confined to the thickness of the eyelids. On the contrary, a fracture of the orbital vault must communicate with the cellular tissue of the eyeball and that beneath the conjunctiva, and thus get in between the palpebræ and their mucous lining, or between the globe and its mucous membrane.

However, in this case, the diagnosis of fracture upon the right side was unavoidable by the cerebral symptoms at first, and subsequently finding loose bone with the probe in the orbits.

As to the treatment, I think that the presence of so large a piece of necrosed bone in proximity with the brain would have caused grave cerebral complications, and its removal was imperatively demanded. Baudens relates a case in which, after a gunshot fracture of the external angular process, a quantity of loose fragments adjusted in their places, and finally consolidated. Desmarres mentions another where he preferred to permit a fistula to form over the lower orbitary margin and to discharge copiously for two years, than to remove the osseous spicula upon which it depended, regarding the operation difficult and dangerous.

The prognosis of my case was unfavourable, the wound being oblique and implicating only one temple. Heister remarked that most of those wounded in one temple, at a certain battle, died immediately or shortly after. On the contrary, Thompson saw, after the battle of Waterloo, ten cases where the ball passed from temple to temple transversely, yet all recovered. Did the vulnerant body pass through the cerebral lobes, as some maintain, to account for the symptoms?

Then a direct wound of the eye is most always fatal, passing back, as it does, implicating the brain; an oblique one less so; and a transverse one least of all.

DOMESTIC SUMMARY.

Bromine in Hospital Gangrene.—Dr. M. GOLDSMITH, Surgeon U. S. V., gives (*American Med. Times*, Sept. 12, 1863) the following consolidated statement of the cases of hospital gangrene, of which he has gathered the records from various U. S. military hospitals. Four of these cases terminated fatally. "One of these cases," he states, "is reported as having been brought into the hospital moribund. Two were cases in which the disease attacked the track of ball wounds passing through the thigh, and in which the bromine was applied to the external parts, the apertures of entrance and exit only, and therefore did not touch the major part of the gangrenous surfaces. One, in which, with a wound like those just mentioned, the cellular tissue of the limb from the trochanter major to the malleoli was destroyed by cellulitis. It will also be noticed, that in four cases the bromine is reported to have failed in arresting the gangrene. In each of these the bromine had been applied, I have reason to believe, much more frequently than is compatible with the establishment of granulation—for bromine is a caustic agent. In one case granulation occurred two days after the abandonment of the bromine, and the use of a weak solution of creasote; in two cases after the use of a solution of the persulphate of iron, and in one case after the use of a cow-dung poultice.

Consolidated Statement of Cases of Hospital Gangrene treated in Louisville, Nashville, Murfreesborough, and New Albany.

	Whole number.	Recovered.	Died.	Amputations.	Average duration of treatment. Days. Hours.	Percentage of deaths.
Treated with bromine in any way	152	148	4	0	5 14	2 63–100
Treated with bromine pure exclusively	27	25	2	0	2 22½	
Treated with bromine in solution exclusively	86	84	2	0	6 11⅗	
Treated with bromine pure after the solution failed	8	8	0	0	12 18	
Treated with bromine after nitric acid failed	23	22	0	1	3 16⅕	
Treated with bromine after other remedies failed	8	8	0	0	3 4	
Treated with nitric acid exclusively	13	5	8	0	3 14 2-5	69 54–100
Treated with other remedies exclusively	13	7	5	1	7 13 5-7	38 47–100
Treated with other remedies after bromine had failed	4	4	0	0		

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"I beg here to call the attention of such of your readers as may be interested in the matter to the fact, that almost all the surgeons who have adopted the bromine treatment of hospital gangrene rely now upon the use of the pure undiluted agent, the various solutions having been found less prompt in their effects, and, for the ends in view, less reliable."

Dr. POST, in a discussion before the New York Academy of Medicine (May

20th, 1863), made the following remarks on the use of bromine in hospital gangrene, as reported in *American Med. Times*, Sept. 12. "The local treatment seemed to have played the most important part in arresting the progress of the disease. The remedy used more than any other was one introduced by Dr. Middleton Goldsmith, Assistant Med. Director. I refer to bromine, or some of its preparations. It is principally with reference to the action of bromine as a local application that I have risen to speak. The preparations of bromine that have been used have been either the pure bromine, a dark red liquid with a pungent odor, or more frequently a preparation analogous to Lugol's solution of iodine—160 grains of the bromide of potassium are dissolved in 4 oz. of water, this solution is placed in a bottle, and an ounce of bromine is added, making a solution of the bromuretted bromide of potassium. In some cases there is a simple residuum, owing doubtless to some existing impurity in one or other of the ingredients. It is a reddish-coloured fluid, from which the fumes of bromine are given off. The mode of making the application has varied somewhat with different surgeons of the hospitals I have visited, but those who used it with the most care and success used it in the manner which I will indicate. In the first place, after the sloughing process has been fully established, when the tissues involved have become positively putrid, and there is a disposition to form a separation between sound and healthy parts, all the dead portions are carefully detached by means of a scissors, after which the denuded part is thoroughly washed with a syringe and lukewarm water; after this the comp. sol. of bromine is brought in contact with every portion of the sore either by means of a camel's hair brush or a small syringe. If there be sinuses, the fluid is injected into them, and the same thing is done with the undermined integument. In case of a gunshot wound through the limb, when the syringe cannot easily be used, a small strip of old linen is attached to the eye of a probe after having been dipped in the solution, and drawn through the wound. This linen is then left in until the next day's dressing.

"The first effect of the bromine was very remarkable in removing all offensive odour—the fetor would be removed in a very remarkable manner, so much so that you had to apply your nose close to the surface of the sore to detect any odour whatever. The next effect was to coagulate the albumen and leave the part as if varnished—there was no appearance of putrefaction whatever. The patients complained of severe pain at the time of the application, but I have reason to believe that such complaints were much exaggerated. The dressing applied after the application of the bromine varied in different cases. In most cases the surgeons were in the habit of applying yeast poultices, and they also used, as a substitute for this, a fermenting substance made by adding carbonate of soda and tartaric acid to a poultice. I suggested to them the propriety of substituting the bicarb. potash for the cream of tartar, on the ground that the gas would in that event be more slowly evolved. In other cases the liq. sod. chlorinata was used; in fact, numerous applications of the sort were made according to the peculiar notion of the surgeon-in-charge.

"I found that there were some of the surgeons in Nashville who were sceptical with regard to the advantages of bromine as a local application, they maintaining that they had better success from the use of nitric acid; but I observed that some of these gentlemen had applied it in rather a careless way, while they had used the nitric acid more thoroughly and with more care. There was one gentleman, particularly, who seemed very sceptical. I informed him, that he had not applied it as carefully and as thoroughly as the other surgeons, and therefore he erred in a good effect. I also suggested, that if he would use it in another way he would have like success. Since I have returned to the city I have received a letter from that gentleman, and he tells me that he has taken my advice with reference to its mode of application, and has been abundantly successful.

"With regard to the constitutional treatment, I believe there can be very little discrepancy of opinion concerning the use of tonics, stimulants, and good food in this disease.

"I will observe, that those gentlemen who have used bromine so largely look upon it as an antidote to the poison, whatever it is, of hospital gangrene, and

consequently they do not advocate the free circulation of fresh air as they otherwise would.

"I observed that bromine was used for disinfecting the atmosphere of the ward, by pouring it into saucers, or by carrying an open-mouthed bottle containing the liquor through the ward. This was done five minutes at a time three times a day, and the fact that the gangrene did not spread where bromine was used, seems strong proof of the existence of the property claimed for it.

The frequency of its application varied with different surgeons from once to twice or three times in twenty-four hours. When the surface of the granulations became visible, the solution was weakened. In the cases that I had the opportunity of seeing, the disease was arrested throughout the great body of the sore within two or three days. In the case of the seton in the back, the disease was not arrested ten days after the application, but I have afterwards understood from Dr. Goldsmith that the disease was finally entirely checked.

"I have come to the conclusion, from what I have seen, that the application in the treatment of hospital gangrene is very highly conducive to the welfare of the patient, and I think that it will prevent the spread of the disease.

"There is one important fact connected with bromine which I think well worth relating. I saw, at Louisville, a case of hospital gangrene of the leg, where, in the course of the disease, the posterior tibial artery became involved, and hemorrhage occurred. The interesting feature in this case was, that the surgeon-in-charge tied the artery at the bottom of the sloughing surface, and applied the bromine immediately over it. I saw that case a little less than a week after the application occurred, and the case was doing remarkably well. The ligature had separated the day before I saw it, and at that time the sore was in a state of healthy granulation. I am unable to say whether any further hemorrhage occurred. Dr. Goldsmith informed me, that the case was the fourth one where such a result was obtained from the application of bromine. This is a very remarkable fact, because the general result of tying arteries in the midst of sloughing parts is that hemorrhage takes place very soon again. If bromine has the power of arresting this sloughing process, it is a fact well worthy of our investigation.

"Dr. POST, in conclusion, alluded to the good effects claimed by the surgeons for bromine in cases of diphtheria and erysipelas. In the 'Park Barracks,' in Louisville, erysipelas broke out with great severity, and the moment that the bromine treatment was introduced the disease ceased to spread. The remedy was used both in fumigation and as a local application. The surgeons were in the habit of moistening lint with the compound solution of bromine, and applying it directly to the part, and covering the whole with oiled-silk. Dr. Post saw a number of cases treated in that way, where improvement had taken place in a very short time. He was informed by those gentlemen who had charge of the erysipelatous hospital, that in almost all cases, in from twelve to twenty-four hours after the commencement of the treatment, the erysipelas began to subside. It scarcely, in any case, continued to spread beyond two or three days; generally its spread was checked within from twelve to twenty-four hours."

Dr. WILLIAM B. ALLEY reports (*Buffalo Med. Jl.*, Sept. 1863) a severe case of hospital gangrene successfully treated by bromine.

Dr. R. S. STANFORD, Surgeon U. S. V., also reports (*American Med. Times*, July 18, 1863) a case of hospital gangrene successfully treated in Hospital No. 12, Louisville, Ky., by the same article, and expresses great confidence in its efficacy.

"From my own observation," he says, "in the treatment of hospital gangrene, erysipelas, and diphtheria, I am entirely satisfied that all of them are local diseases, and may be cured by the use of bromine properly applied. The foregoing case establishes, as far as any single case can do, the efficacy of pure bromine over the compound solution, the latter having been applied daily for the term of twenty-seven days without arresting the gangrenous process, while the pure bromine arrested it upon the first application. The wound was prepared for the reception of the remedy in the same way, and with no more pains

than had been taken upon each application of the solution. The constitutional symptoms subsided within twenty-four hours after the pure bromine had been applied; the gangrenous odour disappeared entirely within the first six hours after the application of the pure remedy. Within twenty-four hours the appetite returned, and has continued good ever since. The skin gradually gave up its dirty yellowish hue; the urine also gradually returned to the normal colour; the pulse dropped down to eighty, and has maintained that number of beats per minute from the second day after the application of the pure remedy up to the present time.

"The patient is now able to walk about the ward, and would do so if he had two legs. The wound has been filled with granulations, and is being skinned over, there only remaining a small portion upon which the skin has not been renewed, and this immediately around the bone.

"If this was the only case I had treated with this remarkable agent, I could not speak in as strong terms as I am now about to do; but I have treated a number of cases that were equally as grave as this one, and with complete success in every instance; and numerous cases in other hospitals have been met, where a like success crowned its proper application. I can say to the profession with unbounded confidence, that we have in bromine an agent that will, when properly applied to gangrenous ulcerations, cure them in every instance with more certainty than quinine cures intermittent fever."

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Veratrum Viride as a Means of Diagnosis in Diseases of the Chest.—Professor Samuel R. Percy, M.D., extols (*American Med. Times*, July 11, 1863) the value of the veratrum viride as a means of diagnosis in diseases of the chest.

He states that since 1856 he has "been in the habit of preparing every patient, whose heart or lungs I have wished to examine, with small and proper doses of veratrum viride, and by this means I have been enabled to arrive at a clear and certain diagnosis of cases of incipient phthisis, pleuritis, pneumonia, diseases of the heart, etc., that I could not clearly diagnose without the previous preparation of the patient with this remedy, owing to functional disturbances or other exciting causes. There are many persons who are examined for these diseases where it is almost impossible to arrive at any correct diagnosis in the early stages of disease, at which time *only* treatment can be expected to be of much avail, owing to even slight functional disturbances, which completely mask or render obscure the signs that without the disturbing causes would be readily recognized. Now veratrum viride quiets these functional disturbances, lessens the rapidity of the circulation, tranquillizes the respiration, and thus so moderates these functions that the mind can readily define and arrange the sounds that are communicated to the ear. I give you this new means of diagnosis as the results of my own investigations. I am not aware that it has ever been practised, except by those to whom I have communicated it. I need not impress upon you its vast importance, for by means of this practice you may always know what you are treating, and you will find that that is no slight gain in your ability to inform your patient of what he may expect from your treatment. This new means of diagnosis will be of inestimable value to the Life Insurance Companies in all cases of doubtful diseases of the chest."

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Extirpation of Parotid Gland.—Prof. D. Brainard reports (*Chicago Med. Journ.*, Aug. 1863) the following example of this:—

"Timothy Brodley, of Fond du Lac, Wisconsin, aged 45, healthy, of good constitution, perceived when he was 21 years of age, a tumour below the body of the lower jaw. This grew to the size of his 'fist' without pain, and was removed in 1850 in Ireland.

"About 1858 he perceived it returning in a small tumour behind the ramus of the jaw on the right side. It grew without pain until Jan. 1863, when it presented the appearance shown in the photographic figure. It then extended up to the zygomatic arch, and down to the middle of the neck, forward upon the side of the face, and backwards under the sterno-mastoid muscle, was detached, very movable, but the skin was adherent to the surface.

"Wednesday, Jan. 14th, 1863, I removed it in presence of the Medical Class of Rush Medical College, assisted by Prof. J. W. Freer.

"Two incisions were made to embrace the adherent portion of the skin, which was then dissected up before and behind. I then commenced separating it from below upwards with the finger. This was readily done till the back and upper part was reached where it involved the external carotid and jugular vein, which were tied below and then divided. The dissection was then completed mostly with a blunt instrument. The upper end of the external carotid artery required ligature, and one branch below. The tumour in its growth had drawn the parotid gland out of its place so that it was not difficult to pass an instrument behind its upper part.

"When the tumour was removed, there was a space extending from the articulation of the lower jaw below the corner of the os-hyoides. The styloid process, stylo-hyoid ligament, the internal jugular vein and internal cerebral artery were exposed, and the space behind and within the ramus of the jaw was cleared.

"Prof. Freer, for many years Prof. of Anatomy in the College, examined carefully and could find no trace of the parotid gland. The right side of the face was paralyzed.

"On examination of the tumour, pieces of the gland in a healthy state were found around the upper edge; below this a considerable part seemed composed of the same tissue altered in structure which was softened and redder than natural. At the lower part there was a softer granulated mass, which Dr. Freer examined with the microscope. He found no common cells, but rounded granules with traces of ducts.

"Without assuming to decide positively as to the tissue in which this disease originated, it is certain that it involved the whole of the parotid gland except slight particles above.

"To the naked eye the structure of it appeared to be the fibro-plastic material. No doubt can, I think, exist as to the removal of the entire gland, which I have removed in two other instances, and the reports of which cases have been heretofore published in this journal.

"The time required to complete the operation was perhaps thirty minutes. The hemorrhage was considerable, but by tying the external carotid before dividing it, this was partly controlled. No accident happened to the patient, and in twenty days he returned home with the wound nearly healed."

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Remarkable Instance of the Glancing of a Minie Ball.—Dr. GEO. F. FRENCH, Act. Ass. Surg. U. S. A., relates (*American Med. Times*, April 4, 1863) the following example of this: "Geo. Fowler, Co. F, 50th N. Y., was admitted into hospital, December 19th, with a gunshot wound received at Fredericksburg, December 13th, the ball entering just behind the left great trochanter, but not emerging. A probe following the track of the ball made an *obtuse* angle of about 115° with the shaft of femur. A small fragment of bone was found splintered from the great trochanter and extracted.

"*Jan.* 3. I discovered tenderness and a point of hardness at upper border of left nates, which was suspected to be the ball, but from its great depth under the muscles, it was impossible to determine. I conferred with two surgeons, who dissented, on the ground that the ball, if there, *must have glanced at an acute angle.* Still, not being able to account for the tender and indurated spot, and the operation being unattended with danger, I cut down two inches through the muscles, and came upon the ball, the *curvature* of which corroborated the supposition as to its direction."

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Lupus successfully treated by Stramonium.—Dr. JOHN HASTINGS reports (*The Pacific Med. and Surg. Journ.*, May, 1863) three cases of lupus successfully treated by stramonium. In two of the cases the bruised leaves, made into a poultice, were applied to the ulcerated surface, and afterwards stramonium used; in the third case the latter ointment was alone employed.

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